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Church and School Architecture.

ONE who read some remarks on the above subject by a correspondent from the other side of the Atlantic, printed in our last number, will require to be told that their appearance in these columns did not necessarily argue the endorsement, on the part of the *Builder*, of each and all of the sentiments expressed. Indeed, considering how a good many of the observations of our American critic flew in the face of some of the most cherished associations of English architects and churchmen, even some portions of them which privately we might not dissent from at all, might have been modified in expression, on Lord Chesterfield's principle that it is not wise to speak the whole truth at all times and in all places. To do so is sometimes to startle into opposition those who, by a more moderate statement of the case, might have been gained as allies.

It is always useful, however, to have the sentiments of those who see a thing in a different light and under different circumstances from our own. In this country we are so much governed by sentiment and association in regard to such a subject as church architecture, for instance, that it is difficult to realise how our practice in this department appears to those who are not under the same influence. Our New York friends, on the contrary, have nothing of this sort to hamper them, no ecclesiastical past to look back to, and they reduce the problem to the conditions of sheer utilitarianism, with a thoroughness of purpose which leads to a somewhat bald and unsatisfying result. Much of what is urged in Mr. Henderson's letter has been, it is true, brought forward by ourselves, not merely once nor twice. We have always discouraged the sentimental symbolism of the ultra-ecclesiological party of church-builders in England; we have even, so far as could be at all consistent with the objects of this journal, gone out of our way at times to expose the folly, from a higher point of view, of a great deal that is going on in the matter of ecclesiastical ceremony at present. On the other hand, however, the American view of the matter is deficient, from our standing-point, in not taking into account the really important influence of sentiment and association, in regard especially to the architecture of buildings so much more than utilitarian in their objects as churches seem to us to be. Of course we must remember, also, what our American critic seems to forget, that the current view of the nature and requirements of a church service must necessarily have its effect on the architectural treatment of the building. If the service is Mediæval the church must be so; and if it were really to appear that the Church of the present day had made up its mind to masquerade in the ecclesiastical guise of the pre-Reformation period, the manifest duty of the architect is to supply, when called upon, the kind of building necessary to carry out the illusion completely. Whatever his private opinion, it is his business not to argue, but to build. Leaving out of question this contingency, however,—believing as we do that the bulk of English worshippers have not made up their minds to any such state of things,—there is still the double influence of association and architectural effect to be considered, in addition to the mere practical healthiness and comfort of a place of worship. The New York ideal of a church seems to be simply a place where every one can sit comfortably, breathe unvitiated air, and hear a preacher. This is the common-sense side of the matter, and far be it from us to disregard or under-rate it. Proper atmospheric regulation in churches is especially a matter of absolute necessity; at least, one would think so if it were not so habitually neglected. Our complaint in regard to English churches, however, has not been mainly that of deficiency of ventilation, though that often exists. An interior so lofty in proportion to its area, and with so much air space, as is the case in many Gothic churches, old and new, does not present much difficulty in the way of ventilation, and, except in very hot and calm weather, will to a great extent ventilate itself. The complaint against the neo-Gothic church, as well as the Mediæval cathedral, on sanitary grounds, is more generally on the score of draughts and insufficient warming, when warming is necessary. We know that serious and sometimes fatal illnesses have often been traced, especially in the case of delicate women, to exposure to cold and draughts in a breezy church, with a large expanse of cold substances—cement, stone, tiles,—around and under foot. So far the complaint against a large number of modern churches, on the ground of discomfort and unhealthiness, is fully sustained. There is no reason why, in the name of religion and church principles, we should subject ourselves to colds and bronchitis. But whether the church is the place for the development of "every modern convenience" may be a question. The fact is that this is a very self-indulgent and luxurious generation; and for all who are blessed with average means, the opportunity of making themselves exceedingly comfortable wherever they go is provided to an extent which is calculated, we think, to enervate and effeminise the rising generation. We should hardly be sorry to see the church, almost the one place of general meeting where it is still admitted that all are on an equality, retained also as the one place from which this over-wrought luxury of the present day is banished, and where a degree of comfort not beyond that which is within the reach of the poorer class is also accepted as sufficient for the time for the needs of the wealthier. If there is any sense or meaning whatever in a great deal of our established form of worship, and in much of what is adopted as the prevalent tone in Dissenting worship also, a church is a place where people are supposed to go in a certain spirit of humility; and we can hardly therefore see the suitability of imparting to its furniture and fittings all the luxury and comfort which meets us in too exaggerated a form, often, in the modern drawing-room. If simplicity, and absence of self-indulgence and ostentation, are but too little characteristic of the domestic life of the day, let these qualities at least be retained in the *appareil* of our places of worship. Any other principle would seem, in England, like a returning to the old days of the squire's pew, with its curtains and cushions, marking it off from the seats for the humbler brethren. Then in regard to the general question of the utilitarian arrangement of churches, in plan as well as in details, there is this to be said,—and it is a consideration which cannot be put on one side,—that the Mediæval form of church, however inconsistent with many of the requirements of modern worship, has been connected for centuries with the English idea of a place of worship. In some respects its practical unsuitability has been a little over-rated; for instance, it is stated on scientific authority that the three-aisled form of building is by no means acoustically unfavourable: it is certain, at any rate, that the same area roofed in one span often proves exceedingly troublesome to the speaker. Other points may be objectionable, and may be susceptible of modification without entirely destroying the association of the old form of church. And it is certain that this association is a powerful element in the feeling with which a place of worship is regarded among us. It may be all very well in New York to make a church into a kind of lecture-room in appearance and plan; but in England nine persons out of ten would not feel that they were in church at all in such a building; and we cannot regard their prejudice as entirely trivial or unreasoning, any more than the feeling which makes a man reluctant to pull down an old and inconvenient house with which all the recollections of his past life are connected. We have never supported mere archaism in church building, and have often urged reformation in it, but not transformation—not that wholesale application o the every-day economies and patents of building which would sweep away all that we have so long connected with the idea of a church. That would be a one-sided proceeding.

Then as to the question of architectural effect. Most of the ideas of utilitarian reform in church building include the extinction of the monumental character of church architecture, and the reduction of the church to the type of a curtained and cushioned theatre or assembly-room. This amounts, in our thinking, to a wanton obliteration of one of the few opportunities for impressive building left to us, and an absolute loss in regard to the relation of the building to its object. Owing to the luxurious habits of modern life, before referred to, it is but very rarely that we can have a chance of producing architecture in its severer form, not smothered beneath a coating of upholstery. Surely a class

of buildings the object of which is not utilitarian, and which are intended not as permanent dwellings, but as temporary meeting-places on special occasions of mental and spiritual aspiration, may very well be retained as the most fitting opportunities for the higher forms of architectural expression. We may go further than this, and say that they are thereby more fitted for their object. There is a good, whether consciously perceived or not, in the effect of an interior on the minds of those assembled in it; and certainly the tone of devotional seriousness must be rather helped than otherwise by the substitution of architectural design, properly so called, for the mere wall-paper and curtain type of finish. For the poorer classes especially this is worth remembering; for to many of them the church, with its arcades, its stained windows, and its music, is, apart from all other considerations, the one bit of something like poetry that finds its way into their lives. Our American correspondent is sweeping in his condemnation of stained windows, as "a custom that has descended from a superstitious age." This is a very New York way of looking at it, and certainly incorrect, unless in a very qualified sense. A great deal of the style of design produced in stained glass at present does, it is true, partake of such a character as that indicated; but that is no necessary quality of stained-glass design, nor need it be such as to unduly darken the interior,—it is better not so, in fact. But stained glass is a beautiful means of giving effect to an interior; nor are we at all sure of the superiority, from any point of view, of the too-garish light of large clear glass windows. In country churches, indeed, there is sometimes less to be said for stained glass; for often the outer landscape, seen through the windows, has more of beauty and suggestiveness than the cunningest worker in stained glass could supply. In one place, perhaps, it is the rich masses of foliage of the adjoining trees which fill up the window; in another the side or outline of a hill; and so on. But in town churches, where a great deal of the surroundings may perhaps be squalid and repelling, or, at best, dull and respectable, stained glass is most invaluable in shutting out the outer world, and giving to the interior a kind of "glamour" and repose, which is to many persons at least most refreshing and restful in its effect. It is possible that the feeling for this kind of repose in the church interior scarcely exists or is understood in the States; but it certainly exists among us, nor is it a feeling by any means to be scouted or derided. And, therefore, while deprecating and, indeed, opposing all attempts at sensational and theatrical ornament and ritual, we do by no means at present wish to see our churches deprived of their architectural and monumental character.

The architecture of schools is, our American correspondent thinks, yet in its infancy, and he may be right. We have hardly arrived at the perfect architectural form of a school yet, though a good many different attempts have been made. On the whole, we may say that the exteriors of our schools are too utilitarian, and the interiors not utilitarian enough. Deficiency of ventilation and imperfection in the system of warming are defects only too common, and the more noticeable as their results in a crowded school are very serious. The present school-building movement is doing a good deal to improve matters in these practical respects, but in general absolutely nothing to ameliorate the state of school architecture. School boards, in fact, are ostentatiously indifferent to this. A case came under our notice, in which a school board in a large town had asked by circular for suggestions, from several head-masters or superintendents of schools for primary education, in regard to any special points which they thought needed improving. One of those who replied had the good sense to add to his other recommendations a remark that architectural interest and style should be considered a matter of importance, as the character of a building had certainly an influence on the children who were educated in it. The administrators of education, however, were proof against any such sentimental nonsense, and appended to this paragraph formally the note, "The Board do not take this into consideration at all in accepting plans." That was at least honest, and probably the gentlemen who made the statement had not the slightest idea that they were doing anything else than exercising a conscientious and salutary check upon unnecessary expenditure. The buildings erected for the London School Board are by no means carelessly carried out in regard to architecture; but in most cases they present little that is attractive, even in their present state, and will look like so many factories when properly coated with smoke and dirt. As a general rule, the architectural aspect of schools is too stern and forbidding looking. We should prefer to see a somewhat more homelike and domestic aspect given to them; in country schools this sometimes is done, and may very often be done equally well in town schools. Architecture is never better employed than in giving an inviting and attractive air to buildings such as these, which too often present a gloomy, prison-like character, not calculated to decrease the natural antipathy of the rising generation to being caught and confined for their own good. Schemes are being mooted for making children's education more amusing and attractive to them than it has generally been. Towards such an end the architect might at least be permitted and encouraged to do what he can in his own province.

GARIBALDI AND HIS PORT OF ROME SCHEME.

During the months of March, April, and May of the present year, there appeared, from time to time, in the daily papers telegrams, letters, and even leading articles on the subject of a scheme for the diverting of the Tiber, and the construction of a "Port of Rome" at Fiumicino. From these it appeared that General Garibaldi was about to add fresh lustre to his renown by becoming as pre-eminent in the arts of peace as he had been in the art of war. It appeared, too, that England, which, as the General remarked in a letter on the subject of these works, has done so much for Italy, was to participate in the glory of the undertaking, in the person of Mr. James Wilkinson, of Westminster, the engineer entrusted with the construction of the harbour. Recently nothing has been heard of the matter, and the public are left to suppose that all is proceeding in successful course. But, unfortunately, such is not the case; and we can fully understand the unwillingness of the journals to disparage one who has deserved so well of his country. It seems desirable, however, to give a short history of the transactions as it has reached us.

Mr. Wilkinson was introduced to General Garibaldi several years ago by the American Consul, and renewed the acquaintance on the 28th of January last by a letter from London, in which he offered his services in connexion with the important public works then contemplated. On the 1st of February the General answered this letter, saying how glad he would be to accept the support, especially of the English, who had done so much for Italy. Mr. Wilkinson went to Rome immediately, and an interview took place on the 7th of February, at which the General explained his views (which were afterwards greatly modified), and made arrangements for an excursion down the river to inspect its course and select a spot for the construction of a harbour at Fiumicino, a small town on a branch of the river from which it takes its name.

The General made the excursion on the 11th of February, accompanied by Mr. Wilkinson, who four days later received instructions, in the presence of an English gentleman, to prepare plans for the port. These instructions were repeated the following day in writing, and, relying implicitly on these engagements, Mr. Wilkinson proceeded, with the assistance of three engineers, who came from England for that purpose, to prepare plans; and as time was a great object, and the weather very bad, he hired a steamer in order to take the soundings, and completed these operations on the evening of the 6th of March. Having lost no time in submitting the preliminary plans to the General, Mr. Wilkinson received an answer from him, in which he expressed his satisfaction therewith, and requested that the detailed plans might be made, so that he might present them "to the Government for their approval, to the Province of the Municipality, to the Commission, and to the National Parliament, whose approbation is indispensable to the carrying out of such a great and important project." Mr. Wilkinson, therefore, at once commenced the drawings of the detailed plans, and on the 2nd of April they were completed and presented to the General, who went carefully through them, and expressed himself entirely satisfied.

On the 12th of April Garibaldi signed a demand to the Government for the concession for the port, it being always understood that he was to transfer the concession to the company to be formed, and that Mr. Wilkinson and those gentlemen, if any, whom he chose to associate with himself, were the only parties acting for the construction of the port. On the 13th of April Mr. Wilkinson, in company with Mr. Menotti Garibaldi, presented the demand for the concession, accompanied by the plans and documents which he had drawn up, to the Minister of Public Works. It was favourably received, and the Superior Council approved the plans, only suggesting certain modifications, consisting chiefly in a wider entrance to the port. The matter proceeded satisfactorily up to the end of April.

However, at a conference at the General's house, held on the 6th of May, in presence of Mr. Baccarini, who came on behalf of the Government to arrange the exact words of the concession, the General produced a plan for the port, drawn up at his request by the architect Landi (who was then present with Semenza, Renzis, and other professional men), and requested that an arrangement should be made with him.

At this time, in consequence, as it appeared, of a statement made to General Garibaldi by General Fabrizis, which had emanated, there is good reason to believe, from Mr. Semenza, to the effect that a gentleman connected with the affair had offered to sell the concession for 250,000 francs (the said gentleman being in no position to do such a thing, besides being the most unlikely person to contemplate it, if he were), the General's tone altered so much that a remonstrance became necessary.

He was, therefore, reminded by letter that arrangements had been made in England, America, Austria, Prussia, France, and Hungary for finding the money; that this had been done, and the plans prepared, on the understanding that Mr. Wilkinson was to construct the port; that he had in writing accepted and approved the terms and drawings submitted to him; and that the matter had proceeded satisfactorily to within a few days of the date of the letter. His request, or rather demand, that an arrangement should be made with Landi, and the fact of his having commissioned De Renzis to settle the terms of the concession for the port of Rome with Mr. Baccarini, were referred to, and it was pointed out that those engaged in the construction of the port should settle the terms of the concession, and that the interference of Messrs. Landi and Renzis was uncalled for and unjust.

The General returned no answer to this, but received Mr. Wilkinson in a friendly way on the 10th, and requested him to return with another gentleman on the 12th. This they accordingly did, and submitted to Garibaldi a short draft agreement in which they bound themselves to construct the port, and to form a syndicate or company for that purpose, and he on his part engaged to leave the arrangement of the project entirely in their hands. He appeared satisfied with it, only adding a few words, and asked them to call with a fair copy of it in the morning, which they did: he then, however, much to their surprise, refused to sign any agreement at all, and even to give them a letter to the effect that when the company was formed he would transfer the concession to it. He said,—"Form a company; when I see they have spent a large sum in the port, I will transfer to them the concession." Of course, no capitalist would ever spend money on such terms.

The General quite ignored the rights of those he had employed, and has not since proposed any arrangement to remunerate them for three months of their services, and a large expenditure of money in preparing the project for him. Mr. Wilkinson finally wrote to General Garibaldi announcing his intention of withdrawing altogether from the undertaking. This letter has not been answered, nor have the plans been returned, as was requested.

This affair, if the statements made to us are correct, is almost sufficient to deter capitalists from investing their money, and professional men from risking the loss of their time and labour in a land the people of which are so intensely "national," that they will decoy, by fair-seeming engagements, a foreign engineer to devote himself to their undertakings, and, when they have obtained the benefits of his skill, band together to deprive him of a part, or, if he will not submit quietly to that, the whole of the fruits of his labour; endeavouring, meanwhile, to make their peace with the world by putting forward an improbable tale.

A description of the proposed port cannot fai

to be interesting, even though it should never be constructed.

The port was to have been situated close to Fiumicino, about sixteen miles from Rome. The approved drawings showed two moles running out from the shore, the southern one 2,050 mètres in length, and the northern one 1,698 mètres; the two inclosing an area of about 118 hectares. The depth of water at the entrance to the harbour would have been nine mètres, so that the largest vessel would have been able to enter. A railway was to have been made from the existing Rome and Civita Vecchia Railway at Ponte Galera Station direct to the Port, and along its northern mole, at the extremity of which the trucks would have been loaded direct from the ships by means of steam cranes. This railway would have passed over only seven miles of country remarkable for its flatness. By means of Trajan's canal, which is about two miles long, water communication along the Tiber to the City of Rome was secured; and to stop the silt which is at present brought down, a lock was to have been constructed at its junction with the river.

The moles, as shown, were constructed entirely of large blocks of concrete (composed of lime, puzzolano, and small stone), weighing 25 tons each. The facilities for this mode of construction are very great, as all the materials occur on the site. The northern mole, 40 ft. wide, was paved with Caprera granite, from the General's quarries, and had a perpendicular face next to that port where the ships were shown to lie. The base of the moles, as shown, was nearly 100 ft. wide, in order to distribute the bearing over as large an area as possible, on account of the alluvial nature of the sea bottom. The total cost of the port, including a lighthouse on the southern mole 25 mètres high, built on cast-iron piles, and fitted with a revolving light, but exclusive of the lock near the Tiber, was estimated at 600,000*l.* sterling.

The entrance of the Port was shown, 150 mètres wide, and accessible to vessels in all weathers, being extremely well protected from heavy seas and prevailing winds and currents. As this port would have been the most central in Italy, and so near the city of Rome, a very large traffic was expected; and the great railway facilities offered an additional inducement to its development. Civita Vecchia now takes the bulk of the coal and other heavy traffic for the city; but it is fifty miles off, and is consequently disqualified for competition with a genuine "Port of Rome."

It was calculated that, taking the port charges as only 1*f.* per ton, they would yield a revenue of 40,000*l.* sterling per annum; and, as the cost was to have been only 600,000*l.*, the affair promised to be a great commercial success.

THE UNDERGROUND POPULATION.

According to the latest returns, 538,829 persons are employed in Great Britain and Ireland in getting and bringing to bank, and distributing, coal, fire-clay, ironstone (in layers, as distinct from iron ore), and shale; of whom 428,611 work under ground, and 110,218 above ground. The Coal Mines Regulation Act includes fire-clay, ironstone, and shale, and the Metalliferous Mines Regulation Act includes all other mining produce. In these latter mines, in Great Britain and Ireland, there are employed 62,306 persons, of whom 35,283 are under ground, and 23,700 above ground in Great Britain, and 1,855 under ground, and 1,468 above ground in Ireland.

This latter Act has a more extensive application than its title indicates. It regulates the operations of mines of flagstone, freestone, limestone, slate, rock-salt, and lignite, as well as the metallic ores; but in one case,—the great slate quarries or mines of Festiniog,—the owners declined to conform with the Act, upon the plea that their works are not mines. At the time the inspector of mines for that district (Mr. T. F. Evans) made his report,—March 27th, 1875,—the matter was left to the Court of Queen's Bench for settlement. In the case of the mineral produce included in the Coal Mines Regulation Act, the inspectors of mines are able to give not only the number of accidents and of deaths proportionate to the number of persons employed under and above ground, but to the number of tons of produce; but in the case of those minerals included in the other Act, an immense reduction takes place in the quantities of some of them in the process of dressing to which they are subjected in order to make them marketable, so that the calculation of any such average of quantity raised to lives lost as that made for the coal mines would only mislead; but, comparing the accidents with the number of persons employed, there appears to have been one fatal accident for every 663 persons employed, and one death in every 604; and distinguishing between the underground and surface workers the ratio is one death in 417 under ground, and one in 1,797 above ground.

Under the former Act there were produced from the mines of Great Britain and Ireland, in 1874, 126,590,108 tons of coal, 2,067,791 tons of fire-clay, 11,693,186 tons of ironstone, and 362,747 tons of shale (principally oil-shale).

In 895 fatal accidents, 1,056 persons were killed, in the same year, in and about the same mines. There were no fatal accidents or deaths in Ireland in 1874; but in Great Britain one fatal accident happened amongst every 602 persons employed in or about the mines, or one death by accident amongst every 510 persons employed. In the same year there was one fatal accident for 157,222 tons of mineral raised, or one death by accident for 133,251 tons.

Mr. James Willis, F.G.S., the inspector of mines for the county of Westmoreland, South Durham, and the North Riding of Yorkshire, shows that the

Number of persons employed in his district in 1874 was	65,541
Tons of mineral raised	23,844,628
Separate fatal accidents	94
Lives lost by accidents	96
Persons employed per separate fatal accident	697
Persons employed per life lost	682
Tons of material raised per separate fatal accident	253,655
Tons of material raised per life lost	248,381

Mr. Willis says of children:—"I have not met with any case of boys being allowed to enter pits under the age specified in the statute; moreover, I do not think there is any disposition on the part of the employers or their officials to permit this. I am of opinion that there is much more readiness on the part of parents, and I speak from experience, to send the children to work under age. I do not speak of the workpeople generally, but of a class among them,—the idle and dissolute." A woman with (say) a couple of workers, would, according to the custom of this district, be entitled to occupy a house rent-free, and a sufficient allowance of fire-coal at a nominal cost of sixpence a fortnight. Mr. Oakley, one of the inspectors of schools, has had frequent complaints from the teachers that boys are permitted to work under age; but, "probably owing to the dependent position, to a certain extent, which the teacher occupies in regard to the colliery owner," no names or cases have been brought under the notice of the inspector of mines.

Plans and elevations are given of houses now being built for miners in the county of Durham, for which no rent is charged. They are built in rows, with small back-yards, as usual. A small pantry is put out into the yard from the kitchen, which is also the scullery. An objectionable feature is an open ashpit within 4 or 5 yards of the pantry-window, and 5 or 6 yards of the back-bedroom window. If these were a little further off, and if the ashpits were so covered as to wholly exclude rainwater, while at the same time admitting a full and free play of air across and under the roofs, it would be a great improvement. But we believe it to be very unwise to provide workmen with houses rent free. It seems too much like providing stabling, &c. If a man is able to work he is able to pay rent, and what is wanted of colliery proprietors and other employers is that they should provide a healthy house at a moderate rent for every family, any one of whom is employed on the works. To induce men to continue to work at a particular colliery by finding them houses rent free is to be too kind.

Curiously enough, the water-rate,—2d. per week, each house,—is charged to the tenants. The water-supply is the first thing which should be made free. There is an incongruity, which is most striking, in providing houses rent free, and charging the tenants with the water-rate. It leads to this inference,—that it is necessary to the commercial success of the mine that persons be induced to continue to work it, but that the state in which they live meantime need not be considered. On this principle it follows that houses should be rent free, which at once strikes a blow at the freedom of the miner and makes him dependent, but that if he require the luxury of a supply of water he must pay for it. The device is worthy of a "political economist." And if the professor of a true science object that this device does not come within the scope of political economy, he has himself to blame in that he allows mere trade rules to be dignified with the name of his science.

The Midland district of England, of which, Mr. Thomas Evans, F.G.S., is the Inspector, comprises the counties of Derby, Nottingham, Leicester, and Warwick. The average number of tons of coal raised per annum per life lost during the last eighteen years was 113,525, whereas in 1874 the quantity was 222,405 tons. There were raised last year in this district nearly twelve millions and a quarter of tons. There were but but three fatal explosions of gas in the year, and they were attended with the loss of three lives; although twenty-nine other persons were more or less injured by explosions at different times. It was in Mr. Wynne's district, North Staffordshire, Cheshire, and Shropshire, where explosions of fire-damp made such havoc in the year 1874, causing at five collieries the death of seventy-eight persons, including fifty at the Astley deep pit at Dukinfield on the 14th of April, 1874, plans of which are given, showing the workings and the air-ways; and Mr. Wynne shows pretty plainly what was the cause of the accident.

Mr. Lionel Brough, F.G.S., Inspector of Mines in the South-Western district, comprising the counties of Gloucester, Monmouth, Somerset, and portions of Brecon and Glamorgan, gives 101,199 tons per life lost in 1874, in the coal, fireclay, and ironstone mines. In the other class of mines in his district there were raised 203,502 tons of hematite iron ore, 461 tons of lead, and 75,224 tons of oolite or *Bath freestone*, in procuring which one person was killed for 139,593 tons produced.

It appears that while many children of ten and under thirteen years of age are employed in most of the mines of Great Britain, few, in comparison with the numbers of older persons employed, work in coal-mines in Ireland. Mr. Joseph Dickinson, F.G.S., reports upon North and East Lancashire, and upon Ireland, that the following numbers of persons were employed in 1874 under the Coal Mines Act:—

	In North and East Lancashire.	In Ireland.
UNDERGROUND.		
Boys of 10 and under 12 years of age	278	0
„ 12 „ 13 „	1,012	1
Male young persons of 13 and under 16	3,184	61
Males above 16	22,092	1,058
ABOVE GROUND.		
Boys of 10 and under 13	139	1
Girls „ „	4	0
Male young persons of 13 and under 16	282	24
Female ditto	24	0
Women above 16	120	2
Males „	5,003	504

Mr. Ralph Moore, Inspector of the Eastern District of Scotland, furnishes in some respects the best report; for he gives the mode of working each mine, the thickness of the seam, the particulars of the ventilation, the depth of the shafts, &c.

Mr. William Alexander, Inspector of the Western District of Scotland, gives a table showing that in one mining locality as many as five persons were killed in the year 1874 per 1,000 employed, although in other parts of his district the average was not more than 1·6 per 1,000, and these in both cases not by explosions, but by falls of the roof and sides, in shafts, &c.

In the Yorkshire district, including Lincolnshire, Mr. Frank N. Wardell, F.G.S., is the inspector, and he states the number of persons employed in the year 1874 at 62,499 above and below ground, who produced 14,827,313 tons of coal; 181,819 tons of fire-clay, and 212,777 tons of ironstone; making a total of 15,221,909 tons of mineral, which gives a proportion of about 244 tons to each person employed. The number of lives lost was 112, giving a proportion of one death to 135,910 tons raised. There were 88 fatal accidents, and in 85 of these one person was killed in each case. Of the remaining three, one occurred at the Oaks Colliery, where, by a very large fall of roof, two men were killed; one at Wincobank Colliery, near Sheffield, where an explosion of gas killed two; and the other at Rawmarsh Colliery, where an explosion of gas killed 23. On the 20th of November, 1874, there were about 460 persons at work in the whole colliery, and the amount of air which was passing up the up-cast shafts, of which there were three, was something like 110,000 cubic feet per

minute; and, trusting wholly to the good ventilation, the men were using naked lights. Colliers do not like the Davy lamp—the safety-lamp mostly used—because it does not give them sufficient light; but Mr. Wardell said in his evidence at the inquest that "I have a very decided opinion that it would be unsafe to work this seam here with any other lights than locked safety-lamps, and I recommend, after much experience of the qualities of different lamps, the Stephenson, as being, under all the circumstances, the safest which a miner can use"; and in his report he says, "Good ventilation is indispensable: there can be no two opinions about that; but it is not everything; and the use of safety-lamps ought not in any way to weaken it; the one is not a substitute for the other. The whole body of air throughout a mine does not require to be brought to the firing point before an explosion can take place"; and he further says "I am more than ever confirmed in my opinion that for the ordinary working collier the Stephenson is the safest lamp he can use, locked by the best known means, and that seems to me to be a rivet. . . . . I think that for the purpose of detecting gas there is no lamp so good as the common Davy, and for this reason I hold it to be the best lamp which a deputy or fire-trier can take with him in his examination."

"INDIAN NOTES" in *MACMILLAN'S MAGAZINE.*

SIR,—I shall esteem it a favour if you will publish this rather long letter for the purpose of eliciting precise information from some of your Anglo-Indian readers concerning the remarkable statements recently made in *Macmillan's Magazine* by Mr. James Routledge,—a gentleman who confesses to have written upon Indian topics as far back as sixteen years ago, and who has had "unusual opportunities" of testing the facts and possibilities he enumerates, and of which he is at once the historian and the prophet. Far from disputing the conclusions of his political arguments, I am disposed, probably from a too slight acquaintance with the subject, to agree with them; but I hope he has better authority for his premisses in matters of policy than he seems to consider necessary in archæological science.

In the first "Notes" published in the July number of *Macmillan* he is in conversation with the commandant of the Fort of Morar, who, while justly condemning the modern barracks and similar public works, points to "a certain domed building" which, says the commandant, "is the only rain-proof place I have for the Queen's Stores, although it has stood 2,000 years." It would appear, then, that there is a domed building in or near the Fort of Morar almost contemporaneous with the Parthenon,—for a traveller with unusual opportunities of learning the truth would hardly retail an absurd exaggeration. But from the very beginning of his notes, Agra is the one place to which he religiously turns, and Akbar the one being to whom he fondly recurs. In spite of statistics of population, which he must have by heart, he is astonished to find that "in going down the narrow streets of Agra, the very stones existing along which Akbar drove, you hardly meet with a European face,"—a note which he has developed in the August number of the same magazine, wherein he describes:—

". . . . The streets of old Agra paved with blocks of stone, like London streets now. . . . . You know that the stones under your carriage-wheels are the very same upon which the magnificent Akbar and others drove in days when other races ruled in this fine city; that the life, rich or poor, is identically the same life in nearly all, if not all, leading characteristics as that which existed here when the wolf and the wild boar held revel in England. . . . . You turn from this to the fort,—the fort of Akbar. . . . . From its walls you see the Taj, standing out like a fairy palace in the wilderness. . . . . You are shown the Somnauth Gates, which Lord Ellenborough made so famous; the guns captured by Sir George Campbell,—famous surely for that. . . . . Then you have that throne of Akbar, beyond all question the grandest judgment-seat in the world. . . . ."

Sir, the books I have consulted show that the great emperor came to the throne of Hindustân 319 years ago; and I infer that he sometimes rode upon an elephant. But the double picture of the "magnificent Akbar" driving upon and along the streets of Old Agra is entitled to the licence always accorded to poetical imagery, although an Indian gharry, even with a Mogul sovereign upon the box, savours less of the sublime than the ridiculous. Then what were his cattle,—bullocks, horses, or a camel? In London streets carriage-wheels do not roll over what are known as blocks of stone; and if the comparison be intended to apply to London footpaths, I venture to say that these are paved with slabs of stone, bordered with granite curbs; while at old Agra the red sandstone covers the whole surface of the roadway. To poor architects, who are taught to judge by analogy—by modes of construction, types of mouldings and ornaments—and by constant reference to historical facts, the slender verandahs, balconies, and kiosks, which grace the winding streets of the native city, do not seem to be those from which people doubtless witnessed the progresses of Akbar. Their delicate details seem to be rather of Shâh Jehân's time. And if there is very little left in Agra of Akbar's buildings, there is surely less remaining to show that the older city of the Afghan kings was situated exactly on the spot now occupied by native Agra,—which is on the right or western bank of the river Jumna. The Emperor Bâber, founder of the Mogul dynasty, and father of Humâyun, who immediately preceded Akbar, is said to have lived on the left or eastern bank (where the railway station is), and his body, before it was carried to Lahore, was deposited at the Râm-Bâgh, on the same side of the river. Is it not likely that Agra, the city of Akbar, was founded in the sixteenth century just as modern Delhi, the city of Shâh Jehân, was founded in the seventeenth upon a virgin site? If so, how about "the wolf and the wild boar"? In Calcutta, jackals still "hold revel" towards the small hours of the morning; and possibly, during the reign of Henry VIII., the wolf and wild boar had greater facilities of revelling in the suburbs of London than they enjoyed a century later. But is native life in Agra now exactly the same as it was even in the sixteenth century, when its streets must have been inhabited, not only by skilled artisans and rich merchants, but by other more ornamental, if less useful, members of society? And the fort, is it that of Akbar? The oldest buildings within it,—probably remnants of Akbar's palace,—are named after Jehân Gheer, his successor. They are of red sandstone, and portions are put together according to absolute principles of wood construction, resembling some of the buildings at Futtehpore Seekree, known to have been built by order of Akbar. But the external gateways and fortifications are veneered with slabs of red sandstone much thinner than the ashlar facing of a London house-front, and cannot be ascribed to workmen of his school. From those walls the Tâj may possibly appear to the eyes of a theatrical critic like "a fairy palace in a wilderness," whatever that may be. To mine, about two years and a half ago, it seemed to be laid amongst foliage and flowers richer and brighter than any to be found in the richest park and brightest garden in all England.

The reference to the "Somnauth Gates" is no doubt innocently made in the belief that every one knows the known facts of their story. But those pine-wood gates, carefully preserved in the fort at Agra, are covered with ornaments which (according to Mr. Fergusson, and lesser authorities) bear no resemblance to early Hindu work. Lord Ellenborough was, of course, sincere when he declared them to be the same gates which, report says, were carried away from India into Afghanistan by Mahmoud of Ghaznee, who lived at the end of the tenth and beginning of the eleventh centuries. That they are not is certain; and to quote Mr. H. G. Keene, than whom few Indian civilians have a better right to be heard upon archæological questions, there is no real evidence that Mahmoud, who destroyed the Temple of Somnauth, carried away from its ruins any gates at all. Then there are "the guns," which are "famous surely," because Sir George Campbell "captured" them! Why more famous than if any other member of the Civil Service of Sir George's age and experience had taken them? Or is the assumption only an adulatory figure of speech, acquired from residence in what florid correspondents call,—"the East"?

Sydney Smith, when in a serious vein, considered that the Emperor Aurangzeb was "an object quite as stupendous as the Alps." The throne of an ancestor ten times nobler than Aurangzeb, may, therefore, not improperly be called "the grandest judgment-seat in the world." But where did Mr. Routledge see Akbar's throne? It is certain that that emperor administered justice in public and in front of his throne, but there is even less to show that what is styled Akbar's throne at Agra is genuine, than that the extraordinary red-sandstone building, an exact copy of which is in the architectural room at the South Kensington Museum, was used for a similar purpose by the same emperor at his palace twenty-two miles from Agra.

Mr. Routledge takes infinite care to impress his readers with the fact that his notes are recent. He visited Cawnpore when "men of mark" (meaning possibly Mr. Disraeli's "superior person") believed that the real Nâna had at last been caught. He varied the monotony of a railway journey with "Dave Carson's jokes," which it seems even then maintained their hold of the Anglo-Indian mind. He went to a "calico ball" at Lucknow, where a gentleman dressed as a barrister was mistaken for Dr. Kenealy. He parenthetically explains that the "Secundra Bâgh," near that city, merely means "garden;" although a page or so further he is "shocked to find that Alexander the Great has left little in India but a name." Yet long ago works of sculpture were discovered, and others are even now being disinterred, which bear indubitable traces of Greek influence or inspiration; at least of men who had been familiar with the followers of Alexander. It is, perhaps, waste of time to carp at what after all is only slipshod writing. But let it be remembered that between this and the prince's return next summer tons of "copy" relating to India will probably be prepared for home consumption. Contributors to a publication so deservedly esteemed as *Macmillan's Magazine* should seek to instruct as well as interest their readers. "Notes" of a similar description, sometimes collected from between the Venetian blinds of a railway carriage, are gradually getting fashionable; and, interlarded with pig-sticking adventures and botanical addenda, are, doubtless, entertaining to a large number of educated people. But a man of "unusual opportunities," and an evident friend of India like Mr. James Routledge, ought not to treat its archæology in so loose a fashion as to perplex even those who can detect the padding, and read between the lines of his rhapsody.

WILLIAM H. WHITE.

P.S.—Agra has been called Akbarâbâd, the city of Akbar. Mr. Keene, above mentioned, the author of the newest "Agra guide," says that "it had been a residence of the Lodi kings, and was occupied by Bâber after he had defeated Ibrahim Khan, in 1526. The foundations of the Fort of the Lodis are said to be still traced on the *left* bank of the Jumna." He makes no allusion in his book to any buildings now existing within the fort of Agra older than the reign of Akbar. But Mr. Fergusson, in the Indian section of his "History of Architecture," says that "the finest, and perhaps the best of the palaces built by the Pathâns, in India, was that built at Agra by Sheer Shâh. . . . . Being the *first*, it had the misfortune to be placed on the highest spot within the walls of the fortress. Hence the present enlightened Government of India pulled it down and replaced it by a more than usually hideous brick erection of their own." Further on Mr. Fergusson alludes to "a fragment that remains"; and I conclude that this fragment is the red sandstone building called after Jehân Gheer. Anyhow, it is not older than the sixteenth century; for Sheer Shâh defeated Humâyun in 1540, and occupied his throne for five years. To quote Mr. Keene again, "It is believed that the founder of the fort was Saleem Shâh, son of Sheer Shâh, who held power during the interregnum of Humâyun (A.D. 1545–53). . . . It is not known that any fragments of the older buildings still remain, that mentioned by Fergusson as having survived the British demolitions being considered by the natives as having formed the drum-stand of Akbar's palace, and being entirely in the style of that monarch's time." W. H. W.

The Sale of Berwick Mansion and Estate.—The sale of Berwick mansion and estate, a fine residence in the county of Salop, took place at the Raven Hotel, Shrewsbury, on the 6th inst. It consists of a substantially-built mansion, and an extensive park. The timber was valued at 21,000*l.*, which was what it would realise in the market from any timber merchant. The rental is 2,965*l.* By various bids, varying from 1,000*l.* to 5,000*l.*, 171,000*l.* were reached, at which price the mansion and estate were knocked down amid much cheering. The amount given was exclusive of the value of the timber. The estate contains about 1,800 acres of first-rate land, and 190 acres of woods and plantations.

THE NEW MASONIC AND PUBLIC HALL, CAMBERWELL.

The New Masonic and Public Hall in Camberwell New-road, which has for some time been in course of erection, will shortly be completed and opened. That portion of the building intended to be devoted to purely Masonic purposes is already finished, and has just been inaugurated, and the hall for general public purposes is in a forward state, and will be ready for occupation during the approaching autumn. The Camberwell New-road elevation of the building is about 25 ft. in height, with a portico entrance in the centre, ornamented with carved Masonic emblems, and above, a tower, terminating with a conical dome and cresting, rises to a height of 54 ft. The front portion of the building contains the apartments intended to be used by the different lodges connected with the craft. These consist of a large banqueting-room, together with a decorated lodge-room, with several anterooms and corridors. The front entrance leads into a hall, or vestibule, which is elaborately finished and decorated, the floor being laid with ornamental encaustic tiles.

The public hall, now in course of erection, is at the rear of the building, and it will have a separate entrance at the east end, as well as that in the front, the first-named entrance being that by which the public will be admitted on occasions when the Masonic apartments and the public hall are in use at the same time. The public hall will be 80 ft. in length and 40 ft. in width, and will seat an audience of upwards of 1,000 persons. It will have a platform and orchestral accommodation at one end, together with retiring and cloak rooms, and at the opposite end there will be a gallery. It is intended to be used for public meetings, lectures, and musical and other entertainments.

Messrs. Payne & Clark are the architects; and the contractor is Mr. Oliver, of Camberwell.

THE HOLBORN SCHEME UNDER THE ARTISANS' DWELLINGS BILL.

The Metropolitan Board of Works on the 6th inst. took action for the first time under the Artisans' Dwellings Bill, recently passed. They adopted by a considerable majority a report from the Works Committee stating that, in the opinion of the committee, certain houses, courts, and alleys within the area represented by the medical officer of health for the Holborn District Board, are unfit for human habitation, and in such a sanitary condition as cannot be effectually remedied otherwise than by an improvement scheme for the re-arrangement and re-construction of the streets and houses within such area or some of them, and recommending that an improvement scheme be made in respect of such area, and that it be referred to the engineer and superintending architect for that purpose. The Board also took exactly similar action in regard to certain houses, courts, and alleys within the area represented by the medical officer of health for the Whitechapel District Board, brought before them in the same manner. Many years ago and often since we brought prominently into notice the frightful condition of most of the courts behind Gray's Inn Lane, using for the purpose the pencil as well as the pen. It is not likely, therefore, that we shall be regarded as desiring to throw any difficulties in the way of their removal, and the substitution of healthful residences, if we press upon the Board and its officers the necessity of moving by degrees. To pull down the whole of the houses in Mr. Isaacs's scheme, including the renovated Tyndall's Buildings, without first making some provision for lodging the inhabitants, would be to produce an amount of misery and distress scarcely calculable. The number of persons dispossessed, according to the schedule given with the original scheme, would be 3,661.

One item of this schedule has considerably annoyed the Society for Improving the Condition of the Labouring Classes (Lord Shaftesbury's Society), and has led to a correspondence. In this schedule Mr. Isaacs has entered Tyndall's Buildings as comprising nineteen houses, 151 families, and a population of 608. Mr. Charles Payne, on the part of the Society, states that the number of families is 86, and of persons only 321.

Dr. Gibbon, the medical officer of health, agrees with him in thinking that there must be some mistake in the schedule, and testifies to the excellent sanitary arrangements of the Court, but all the reply he can get from the surveyor is that "Mr. Stannard, the assistant inspector of nuisances, took the numbers, at my request, some two or three months ago, and he assures me he was very particular in his inquiries, as also in entering in his book the particulars which were furnished to him at the time"; and "that it is quite the custom of the tenants to deceive their landlords as to the number of their children; that is to say, on application for a room or rooms, a person will state that the family consists of one or two children, when in reality there are four or five."

Surely, however, Mr. Payne must know.

HOUSES WITHOUT SEWERS.

It transpired at the meeting of the Rotherhithe Vestry last week that there are a number of houses in that parish which are without sewer connexion. The attention of the Vestry was directed to the fact that the houses in Abbeyfield-road, Southwark Park, had been occupied for some time, but that the sewers had not been put in the road, the result of which now was that the temporary cesspools had overflowed, and the yards were covered with sewage. The surveyor explained that the work was not put in hand because the whole of the owners had not paid their instalments for the work. It was remarked that it was very hard upon those owners who had paid that the work should not be proceeded with, and it was resolved that the necessary work should be carried out, and the defaulting owners summoned.

SALE OF THE MATERIALS OF THE BOW AND CAMBERWELL HALLS.

The departure of Messrs. Moody and Sankey for America was followed last week by the sale of the materials of the two halls which had been erected for their services at Bow and Camberwell respectively by Messrs. Perry, the contractors. The sale took place by order of Messrs. Perry, who, under the building arrangements, were entitled to the materials. The sale was conducted by Messrs. Fuller, Horsey, & Co. The materials of the Bow Hall were divided into 158 lots, the slates not being included, and the sum realised was a little more than 1,000*l*. The materials of the Camberwell Hall consisted of 140 lots, which fetched about 850*l*. The contract price for the two buildings was about 6,000*l*.

WHITWORTH SCHOLARSHIP PRIZES.

We gave last week the names of the successful candidates in 1875 for Whitworth Scholarships; the following is a list of those who have gained Whitworth Scholarship prizes, 1875:—

William Martin, first prize, 100*l*.; William Sisson, second prize, 80*l*. (specially increased to 80*l*. for the great advance made since he obtained the Scholarship); Thomas L. Daltry, third prize, 50*l*.; Robert A. Sloan, fourth prize, 40*l*.; Frederick Stubbs, fifth prize, 30*l*.

UNDERGROUND APARTMENTS, OXFORD STREET.

As the workmen in the employment of the Chartered Gas Company were laying down a main pipe opposite to Stratford-place, Oxford-street (in the middle of the road) they came in contact with some brickwork of a very hard nature. Having ascertained that there was no sewer in that part of the road, the men applied their pickaxes with vigour, and it was discovered that they had come upon the crown of the arch of a brick subterranean building, containing several rooms in a fairly good condition. The principal chamber opened is described to us as about 17 ft. long, by 8 ft. wide, and about 7 ft. high. It included some small freestone pillars, the angles of which were chamfered, and some small (window?) openings. The apartments communicated one with another, and had about 2 ft. of water in them and much foul air. It is to be regretted that no one able to pronounce as to the age or purpose of the construction appears to have seen it. The Tyburn, a brook that rose near Hampstead, and ran south into the Thames (and which gave to the gallows at the end of the Edgware-road its name, Tyburn Tree), crossed Oxford-street at this same spot, namely, opposite Stratford-place, and made its way by Lower Brook-street to the Green Park. It may be supposed, therefore, that the constructions to which we have referred had some connexion with the brook. Another suggestion is that they were connected with the Lord Mayor's Banqueting House, which formerly stood near the spot.

CHURCH BUILDING NEWS.

Earlestown (near Warrington).—The foundation-stone of the intended new church at Earlestown, has been laid by Mrs. Legh, of Lyme. The church is to be dedicated to St. John the Baptist. The architecture is of the Transitional Early English Period. The portion now intended to be built, of Yorkshire stone, comprises half the nave and aisles, transepts, chancel, and vestry, and will accommodate 600 persons, a piece of land being reserved for a future addition. The site has been presented by Mr. W. J. Legh, the lord of the manor, who has also given a donation to the building fund of 1,500*l*., and 500*l*. towards the endowment fund. Messrs. Whitley (son of the rector) & Fry, of Dover, are the architects. Mr. Joseph Pennington is the builder, and Mr. J. W. Randle, clerk of the works.

Redditch. — The increasing population of Redditch has rendered necessary extended church accommodation, and on the 30th ult., Lady Mary Windsor Clive laid the corner-stone of a new building intended at first to be used as a chapel of ease to the parish church, but in all probability to be developed into a separate living. The site of the new edifice, near the Beoley-road, was given by Lady Clive, and considerable progress has already been made with the work. About 3,000*l*. have been raised, and it is estimated that about 7,000*l*. will still be required to complete the building. The plans for the new church were prepared by Mr. F. Preedy, of London, the builder being Mr. T. Garbutt, of Malvern Link. The style will be Gothic, with clearstory and bell-turret at the east end of the nave. The church will consist of a nave, 70 ft. by 30 ft.; side aisle on the north, 70 ft. by 8 ft. 6 in.; choir and chancel, 30 ft. by 20 ft. 6 in. It will contain 400 sittings, 200 of which will be free. The building will be of the local Hewell rubble stone, with Bath stone dressings, and there will be an open-timbered roof. The aisle will not at present be completed, but the north will be built temporarily, so that the aisle can afterwards be added.

Ely.—The chief stone of the new church for the district of Colham has been laid, the edifice being dedicated to St. Etheldreda. The dimensions are:—Nave, 24 ft. by 48 ft.; chancel, 17 ft. by 24 ft. The church will be faced with Elton stone, with Bath stone dressing, and there will be a bell-turret at the west end for two bells. The roofs are to be constructed of open timber, stained and varnished, and plastered between the rafters. The vestry will be on the north side of the porch. The church will hold about 170 persons. Mr. W. Smith is the architect.

Killowen (Derry).—The parish church of St. John, Killowen, near Derry, having undergone extensive alterations, has been consecrated and formally opened by the Bishop of the diocese. The old edifice has been almost entirely rebuilt. Traceried cut stone windows of Early Decorated type supersede the old ones; the walls have been lowered; and a highly-pitched roof replaces the former one, with a bell-cot, 70 ft. high to apex. The east end of the church has been enlarged, a new chancel and robing-room having been added, as also a side-entrance porch. All the windows are filled with tinted rolled cathedral quarry lights. The roofs are open, that of the nave ceiled at the hammer-beam, with stained and varnished timbers. The open benches, pulpit, and fittings are of pitch pine varnished. The chancel will be inlaid with encaustic tiles, and also the porch and passages. The heating is by Porritt's underground stove. The church is lighted by floriated and gilt wrought-iron standards in the nave, and coronæ in the chancel and porch. The general works were performed by Messrs. M'Clelland & Co., Derry; the gasfittings by Messrs. A. D. Williamson & Co.; and the varnishing and painter's work by Messrs. J. & D. Baxter, Coleraine. Mr. J. G. Ferguson, Derry, was the architect.

Addlethorpe (Lincolnshire). — This fine old church has been partially restored. All the old oak benches, with their carved heads, have been carefully preserved, and where necessary restored.

The ugly deal pews have been swept away, as also has the rotten floor, and in their place a new floor and open benches have been introduced. The work is being carried out under the supervision of the curate in charge (the Rev. J. Whitworth), and the woodwork has been entrusted to Mr. Lowis, of Ingoldmells. The stonework of the south-east window has been rebuilt, Ancaster stone being used, and the whole has been completed by Mr. Smith, stonemason, Spilsby. The interior restoration will cost about 300*l*.

Roxby.—On the 28th ult. this village presented a festive aspect, on the occasion of the re-opening of the ancient parish church of St. Mary, after a thorough repairing, including new roofing and reseating, under the direction of Mr. Fowler, of Louth, the diocesan architect. The church consists of a short wide nave and aisles, a spacious chancel, western tower, and south porch, with a new organ-chamber on the north side of the chancel. A tower arch has been inserted in place of the old last-century doorway.

Dinting.—Holy Trinity Church, which was consecrated on the 31st ult., by the Bishop of Lichfield, has been built from designs and under the superintendence of Messrs. Mills & Murgatroyd, architects, Manchester. It consists of nave and clearstory, 74 ft. by 26½ ft., and 19½ ft. high to the apex of the roof; north and south aisles respectively 74 ft. and 60 ft. long by 8½ ft. wide, and 20 ft. high; chancel, with octagonal apex, 28 ft. by 18 ft.; organ-chamber, 16 ft. by 13 ft., forming externally a transept on the south side. There is also a vestry on the north side of the chancel. At the west end of the south aisle is the tower, 18 ft. square, with angle buttresses tapering upwards, and finishing with pinnacles, from the base of which springs the octagonal spire, measuring in all 137 ft. from the ground to the top of the vane. The exterior of the church is of stone. The style is that of the latter part of the thirteenth century. The main entrance-porch is under the tower. A spiral staircase leads to the belfry, in which is hung a peal of six bells, by Warner & Sons. In the interior, the piers dividing the nave from the aisles are of stone, circular, with moulded caps and bases. The walls are lined with cream-coloured brick, relieved by bands, &c., of warm brown, the arches, window-jambs, &c., being in moulded brick. The roof is open-timbered, lined with boarding, stained and varnished, the principal ribs carried on stone moulded corbels, the windows glazed with cathedral tinted glass, the seats open, of pitch-pine, varnished. The chancel roof has moulded groining ribs, filled in with boarding, all varnished, with carved bosses at the apex; the ribs are supported on stone corbels, carved with figures representing angels with musical instruments, &c. The building will seat 450 adults, and is warmed by one of Whitaker's convoluted stoves. The contract, amounting to about 6,500*l*., was taken by Mr. Southern, of Manchester, the sub-contractors being Mr. Cordingly for masonry, Mr. Hamilton for brickwork, Mr. Lightfoot for plumbing and glazing, Mr. Dovey for gas coronal and vane, Mr. Oppenheimer for chancel tiling, &c. Mr. Bonehill, of Manchester, has carried out the carving.

Garlands (near Carlisle).—The new chapel, for the use of inmates of the Cumberland and Westmoreland Lunatic Asylum at Garlands, was opened on the 6th inst. by the Bishop of Carlisle. It stands in its own grounds on the left side of the road, in approaching the Garlands from Carlisle, and is quite detached from the asylum itself. Mr. Cory, the architect, has adopted a simple rendering of Perpendicular Gothic in carrying out the design, the chapel being planned with a special view to the reception of its inmates —a separate porch being made for each sex, and the passages being unusually wide. The nave is 80 ft. long by 30 ft. wide; the chancel is 26 ft. 6 in. by 17 ft. 6 in.; and there is a small vestry. The church is well lighted by side windows, and a large east window of four lights divided into traceried sections; and the timber of the roof, the top of which is 41 ft. high, is treated in a simple but ornamental manner. There is sitting accommodation for 300 persons in the nave; seats are provided in the chancel for the medical superintendent and his establishment, the reading-desk and pulpit being on either side of the chancel arch. A square tower, 41 ft. high, is surmounted by a spire 20 ft. higher. The building has been constructed of the red sandstone of the district, by Mr. Charles Armstrong, of this city. The estimated cost was 2,286*l*.

DISSENTING CHURCH-BUILDING NEWS.

York.—During the last three years the Wesleyan Methodists have held services in a school-chapel in the neighbourhood of Cemetery-road and Melbourne-terrace. To meet the requirements, however, of an increased population, it was resolved to build a new chapel, and the foundation-stone has been laid. Two plans were proposed by Mr. Edward Taylor, architect, Stonegate, in this city,—one for a building in the Gothic, and another in the Italian style,—and after discussion the latter was agreed upon. Tenders were advertised for, and out of forty the lowest amount was 6,689*l*. 16*s*. 9*d*., exclusive of site, internal fittings, &c. The chapel will accommodate 850 persons, and about 200 seats will be free. An additional schoolroom and several vestries have been added, so that 450 children will be provided for. The principal front will be in Melbourne-terrace. The internal dimensions of the chapel will be 87 ft. by 51 ft. 6 in., and 37 ft. high. The seniors' schoolroom, which will be on the ground-floor, will be 45 ft. by 27 ft., and 17 ft. high. The stewards' vestry, 23 ft. by 15 ft.; four class-rooms, 18 ft. by 13 ft. The tower will be placed over the principal entrance, and will be 90 ft. in height. The ceiling will be panelled and moulded, and the wood-fittings stained and varnished. The total area of the site is 1,604 square yards. The estimated cost is 7,000*l*.

Hatfield Heath.—The foundation-stone of a new Congregational Chapel has been laid here by Mr. Isaac Perry. The site is an extension of that of the old chapel, and the estimated cost is 3,300*l*., the contract being for 3,000*l*. Mr. Cornell, of Bishop Stortford, is the contractor, and Mr. Banks the architect.

Halifax.—The increasing Stannary congregation having rendered the present building inadequate for the requirements of both chapel and school, the erection of an edifice on the adjoining vacant land for the purpose of the former was resolved on, and the corner stones have been laid. Subscriptions were promised to the amount of 5,737*l*., which left a balance of only 2,300*l* to be raised. The plans of Mr. F. W. Petty, architect, were approved, and by these plans extra school accommodation will be afforded. From the basement a wide stone staircase will communicate with the church over, and forward to the gallery. The entrances will be from Stannary-street and Alma-street, communicating from side to side with wide lobbies, in which will be stairs to the galleries. An arrangement is also made for the scholars in the school adjoining to pass from the school floor direct into the gallery, to seats appointed for them. Seating will be provided for 1,500 people in the body of the church and galleries. The design is in the Gothic style. At one angle will be a tower with plated spire. Internally the building will be divided into aisles and nave, with iron pillars supporting moulded arches, in the spandrel of which will be clearstory windows. At the pulpit end of the church the recess usually occupied by organs in chapels is to be opened out, and a five-light stained glass window placed at the east end. The total amount of contracts is 7,000*l*., distributed among the following: — Masons, B. & R. Hopkinson; joiner, James Smith; plumber and glazier, R. P. Stafford; slaters and plasterers, A. Bancroft & Son; painters, White & Stringer; ironfounder, J. Berry.

Norwich.—The new Baptist chapel which has been erected on the Unthanks-road, for the accommodation of the Rev. T. Wheeler and his congregation, has been opened. The building is from the designs of Mr. E. Boardman. The plan is that of a "church," with nave, aisles, and an apse, and is in the Early Gothic style of architecture. It is faced with Kentish rag stone, with Bath stone dressings. The nave has an open Memel timber roof, and is divided into panels by the moulded principals, purlins, &c. It is lighted on each side from above by ten clearstory windows. The arcading dividing the nave from the aisles is on either side supported by four red Mansfield stone columns, with moulded capitals. The apse is octagon-ended in form, and is lighted with three windows, filled with stained glass of geometrical pattern. Two of these are memoral windows. The string course along these windows is wrought stone work. All the windows are glazed with cathedral glass. The pulpit is on the north side of the entrance to the apse, in which are seats for the choir and space for an organ. Within the railing at the front of the apse is the baptistery. There is a small gallery at the south end capable of accommodating about sixty persons. Sunday school work will be carried on in suitable rooms below the church. The contract was for 4,770*l*., but there are extras to the amount of 350*l*. The contractor was Mr. J. Harrison, and the sub-contractor for the brickwork Mr. J. Barnes, and for the stonework Mr. J. R. Childs. To Mr. Harvey was entrusted the glazing; to Mr. Pank, the gasfittings; and to Mr. North, the plastering.

Chester.—The congregation of the Independent chapel in Commonhall-street, finding that a new church, affording larger scope for usefulness, was imperatively required, the site in Upper Northgate-street was secured, and the work of building was commenced soon afterwards. The plans of Mr. T. M. Lockwood, architect, of this city, were adopted. The style of the building is that of the thirteenth-century Gothic. The gabled front to Northgate-street is of white Storeton-hill stone, and has on the north side of it a square tower of the same material, which, at the height of 42 ft., becomes octagonal, and is then pierced by eight or ten belfry-lights, terminating with a broach spire and vane, at a height of 100 ft. In the gable is a large five-light lancet window, having broad stone mullions, with detached shafts of red Mansfield stone, with carved caps and bases. Below, the vestibule, which is 7 ft. wide, is lighted by four lancet windows, and on each side of it are the main entrances, through porches, the doorways being enriched by shafts of red granite, with carved caps and bases. The length of the interior is 72 ft. 6 in., the width 38 ft. 6 in., and the height 32 ft. 3 in. to the ceiling, and 42 ft. to the ridge. The principals of the roof are shown, and, like the other woodwork, are of pitch-pine, stained and varnished. The pulpit, which stands in a recessed moulded arch, with black marble shafts and white stone capitals and bases, is of the same wood, carved. The seats are open, having book-rests and hat-rails. Accommodation is provided on the ground-floor for 500 persons. On each side of the church are six double-light lancet windows, having detached black marble shafts, with carved caps and bases of white stone, in front of mullions, which are of moulded bricks. On the exterior, these windows are divided by buttresses, capped with stone. Artificial light will be supplied by three large pendants from the principals of the roof, and the building will be warmed with hot air. The contract was let to Mr. Thomas Richards, of Upper Northgate-street, to erect the building for 3,240*l*., sub-letting the stonework to Messrs. Cooke & Moulton, and the brickwork to Messrs. W. & J. Vernon. The total cost is estimated at 4,400*l*.

Halton.—The opening services in connexion with Trinity Wesleyan Chapel have been held. The buildings were erected from designs by Mr. C. C. Ellison, of Liverpool, architect, and consist of chapel, vestry, and school-room; the former having seats for about 300, and the latter 200 persons, all on the ground floor. The style is Gothic, and the chapel is arranged with an aisle on each side, entered by porticos and vestibules from the front, with a good hammer-beam roof, and diagonal-boarded ceiling, with perforated panelling in the centre, for ventilation. The front gable is filled in with two three-light windows with traceried heads, and the sides with couplets, the other end being occupied by a chancel, with moulded and decorated arch, polished marble shafts, Caen stone carved caps, &c., and a four-light traceried window, filled in with stained glass. A reredos fills in the space beneath the window, having a centre bay over the communion-table, and arcades on either side, all in Caen stone, with clustered shafts of variegated polished marbles, and the panels filled in with zinc plates, decorated in colours and gold. The pulpit and font are of Caen stone, each having polished marble clustered shafts and inlays of marble in the panels. The font is the gift of the contractor, Mr. C. Holland, of Chester. The woodwork is pitch-pine, stained walnut and parts ebonised. For the exterior, blue stone from Wales for walling is used, with dressings and mouldings of white stone, and shafts of polished red granite. Messrs. Brown & Downing, of Birmingham, supplied the metal work and gasfittings; and Messrs. Holloway, of Liverpool, the stained-glass work.

Constantinople.—Serkis Bey, the principal architect of the Palace, will, it is stated, be entrusted with the construction of the Bagdad Railway.

RUSTING OF IRON IN WATER.

With a view to investigate more fully the action on iron boiler-plates of soda, lime, chloride of barium, and other substances commonly used for the prevention of "scale," Professor A. Wagner, of Munich, lately instituted a series of experiments, which are detailed in recent numbers of the *Bayerisches Gewerbe u. Industrie Blatt*, and the *Deutsches Industrie Zeitung*, and of which the following is a summary:—

The mode of experiment adopted was to subject small strips of iron, cut from a single plate, to the action, first, of a given quantity of distilled water (75 cubic centm.), and afterwards of aqueous solutions of the various substances in use as "scale-preventives." In this way it was demonstrated how rust forms at ordinary temperatures. Subsequently, the conditions were varied: for one whole week the solutions were saturated with pure air, by means of an aspirator connected with a receiver containing potassium; for another week a current of air charged with carbonic acid was passed through them. At the end of each period, the strips were taken out, carefully, washed and dried, and weighed; the quantity of iron in each bath being determined by analysis at the same time. These were the results:—

In distilled water saturated with a mixture of atmospheric air and carbonic acid, iron was found to rust twice as fast as in distilled water saturated with pure atmospheric air.

In well-water concentrated by boiling the results were very different. Oxidation was there most active when the water contained pure air, and this irrespective of the salts present, except in the case of those having an alkaline reaction. In water containing chloride of barium and lime, and saturated with atmospheric air freed from carbonic acid, iron rusted very energetically. Oxidation proceeded less rapidly when the air contained carbonic acid. A contrary result was obtained with the chlorides of potash and soda, and even with sal-ammoniac and chloride of magnesia.

In one experiment oil was added to well-water, and the latter boiled down to the requisite volume,—75 cubic centm. Here oxidation was much less active in the presence of pure air than with an admixture of air and carbonic acid.

Substances with an akaline reaction, as lime and soda, were found to prevent the formation of rust altogether. This has long been known. Hütten has asserted that the formation of rust is prevented only so long as the oxygen of the air is not absorbed by the solution, and that such absorption takes place more slowly in saline solutions than in pure water. Professor Wagner believes that he has proved that saline solutions absorb as much gas in given times as pure water.

Wishing to ascertain how far the foregoing results were modified by the presence of heat, the Professor instituted a second set of experiments, in which the water was kept boiling by day, and allowed to cool and absorb air from the atmosphere by night,—the conditions thus being closely analogous to those to which water in ordinary boilers is subject. With distilled water, the loss of weight in the iron, or, in other words, the amount of oxidation, was found to increase from week to week, so long as the trial continued. With well-water (giving 0 gr. 76 c. of residue) iron rusted more slowly, and the loss of weight at the end of six weeks was just one-half only of what it was in distilled water. The carbonate of lime in well-water is therefore, a pretty effectual preservative against rust.

On adding a little chloride of barium to the water, the iron at the end of six weeks was found to have lost about the same weight as in the preceding instance, but the comparison of the weights at the end of each week of the period showed that oxidation had proceeded more regularly and uniformly. In solutions of the chlorides of barium and soda the loss of weight on the iron, at the end of six weeks, was slightly less than in pure water; during the first two weeks it was very rapid, and afterwards slow and uniform in degree. On the other hand, in solutions of soda and potash, the loss of weight was greater than in pure water, and, as in the last case, more rapid at first than afterwards. This appears to confirm the popular view of the deteriorating action of sea-water on ships' boilers.

The same phenomenon was observable when a neutral solution of chloride of magnesia was used. At first the rusting was very energetic; then slower in its action; latterly, very slow indeed. In this case, as it was feared the magnesia might decompose with the heat, and liberate hydrochloric acid, sufficient lime was added to neutralise the effects of the latter should it make its appearance. In this way, the oxidation of the iron was somewhat retarded, but, at the end of the fourth week, the results were the same as though no lime had been added.

Sal-ammoniac caused the most rapid deterioration of the iron; it was also most rapid in its action at the commencement, but it continued fairly energetic throughout the course of the experiment.

In solutions having an alkaline re-action, such as lime-water and soda-ley, the iron underwent not the slightest change; it was effectually preserved from rust. The addition of a little oil to the water notably decreased the amount of rust, which, at first, did not show at all, and afterwards only in smaller quantities. An iron pipe half filled with distilled water, and exposed to the air, was found to rust twice as fast as a similar pipe completely filled. This illustrates the injurious effects of interruptions in the service of a boiler. After having thus tested the effects of various salts on iron in the presence of atmospheric air, with and without an admixture of carbonic-acid gas, Professor Wagner wished to try the action of chlorine compounds on iron, exposed to heat, but carefully secluded from atmospheric action. The results were positive with the chloride of magnesia, and negative with the chlorides of soda, potash, barium, and lime.

The foregoing experiments,—those at ordinary temperatures, and at a temperature corresponding to the boiling-point of water, alike,—show that chlorine salts, such as the chlorides of magnesia, soda, potash, barium, and lime, and the hydrochlorate of ammonia, all exert an injurious action on iron if exposed to the action of the air. This consideration is of some importance in boilers. It is a question whether the addition of barium chloride to the feed-water is always beneficial in its results,—whether the elimination of the sulphate of lime thus effected is not counterbalanced by the production of some chlorine compound? In water containing much magnesia, such addition must prove detrimental by inducing the formation of chloride of magnesia.

Well or spring water, it has been seen, is less injurious to iron than pure water. This, probably, is due to the precipitation of carbonate of lime in the form of scale. From this point of view, a thin deposit of calcareous scale would appear advantageous, as protecting the iron from oxidation.

The use of sal-ammoniac as a "scale-preventive" should be invariably rejected, as in every case ammonical solutions are shown to have a very injurious effect on iron.

Professor Wagner's experiments show that the addition of oil or fatty matter has no injurious effect on iron, and that it prevents the formation of rust. The experiments were not, however, extended to temperatures in excess of 212° F., consequently there is nothing in them to prove that such additions may not act detrimentally at higher temperatures, as many authorities maintain. Substances having alkaline reactions,—such as lime and soda,—effectually prevent the oxidation of boiler-plates; they may therefore be safely recommended as "scale preventives," so long as they are added in suitable quantities, and not in excess.

DWELLINGS OF DANISH WORKPEOPLE

A Danish pamphleteer has compared the dwellings of the Copenhagen workpeople with those of operatives in the old town of Edinburgh. The Dane is lodged in the back part of a several storied house, generally in the so-called cellar, or half underground apartment, which may open into a dingy court 9 or 10 ft. square. There is little light or ventilation, and the people keep their apartments as close as possible; if willing to open their windows they can hardly do so for the effluvia from the latrines and open gutters in the court. The general and special smells of Copenhagen are hardly to be matched in any part of Europe. The average number of cubic feet of air to an individual is 213; in very many cases, however, the number is 45 cubic feet and less. It is not uncommon for two unmarried Danish workmen to take a furnished room between them. Such a room will cost four or five dollars a month, say 10s. A separate room for one man will be about 6s. 6d. a month. Married men take unfurnished lodgings, which consist of two rooms and a kitchen, costing about six dollars, or 13s. per month. The furniture and adjuncts are very often hired; are all of a rough description.

To meet the wants of the working classes, building societies have been started, which between 1851 and 1870 gave lodging room for about 3,200 persons in Copenhagen, in the form of 71 houses with 777 apartments. The most important of these societies was started by Messrs. Burmeister & Wain, the largest employers of labour in Denmark. The object they had in view was to introduce the cottage system, then almost unknown in the country. In its original shape the society was exclusively for the workmen in the firm's factory where about 800 were employed. A loan on mortgage was obtained from the Copenhagen Savings Bank, and a piece of ground was presented by a philanthropic manufacturer, M. Holmblad. The plan was that every member should pay one mark or 4½d. a week, and a deposit of one dollar or 2s. 2d. The houses when finished or unoccupied to be drawn for by lot; the member winning to pay a fair rent for the house; the excess of the rent over the interest (6 per cent.) on the actual cost of the house to be credited to the occupier who in twenty-eight years would thus repay the capital and be entitled to a conveyance of the house in freehold. The houses are two-floored; and if the tenant prefer to let the first floor, he would be able to work off his debt in ten years. Members who do not win are entitled to claim the entire amount of their deposits after eighteen years, and in certain other specified cases; temporary suspensions of the subscriptions for special reasons are allowed; members may cede their rights to other members, and so forth. The Society has now been thrown open to the operatives of the capital generally. It has built thirty-six two-floored cottages in rows, each having a small court and garden, and two or three rooms with a kitchen, being in all accommodation for 280 persons. The rent of a first-floor would be about 7*l.* 10*s.*, of a ground-floor 6*l.* 10*s.* a year. This system offers great advantages to operatives, for at the worst they have invested their money in a savings bank; at the best their first rent-charge is only 6*l.* or 7*l.* a year, whereas their less fortunate fellows must pay at least 8*l.* a year for much worse accommodation on a flat. Of the other enterprises of a like kind four have been set on foot by share companies; with three of these are associated baths and wash-houses. All these companies have been founded by the philanthropic efforts of capitalists, professional persons, and others, the operatives having, as a rule, hung back until the general arrangements were made. Everything, indeed, it is said, has been done for the working classes, nothing by them.

In the direction of co-operative stores great efforts have been made to benefit the workpeople. There are now in Denwark 37 stores on the Rochdale model. The Rev. Mr. Sonne, of Thisted, has the credit of having been the founder of the first Danish store, and the Government has acknowledged his zeal by decorating him with the order of the Dannebrog. He is, however, so far removed from the good graces of the trading classes as to be spoken of as a malignant incendiary. Mr. Sonne began operations by inducing 83 operatives to subscribe 3d. a week each to a share fund, of which he undertook the management. His next move was to contract with a baker, who, upon being guaranteed the custom of the Society, allowed the members large discount on all purchases of bread. The discount was saved up until after four months' delay it amounted to 6*l.*, when the society ventured to lease a house, and to begin buying on its own account. As definitely organised, the society consisted of shareholders, with five shares at 11*s.* to be paid up in weekly instalments of 3d.; entrance fee 1d.: election by ballot; sales at current prices. After a quarter's business the Thisted store was able to pay 5 per cent. on capital, and to allow purchasers 2d. discount on the Danish dollar (2*s.* 2d.).

Danish wages are somewhat higher than what were paid a quarter of a century ago, especially for unskilled work. But the rise has not kept pace with the increased price of food and lodging (from 30 to 40 per cent. since 1850), so that the improvement in the artisan's condition has lagged behind that of the country at large. The labour market is generally glutted, partly, no doubt, owing to the constant influx of Swedish, and even of German artisans. The Swedish mechanic or field labourer can travel to Denmark for 2*s.* or 3*s.*, he gets higher wages than at home, and can adapt himself at once to the local habits which, in fact, like the language, are nearly identical

with his own. The average earnings of good hands are:—for bricklayers, carpenters, paviours, 15s. 6d. to 17s. 6d. per week; smiths, 20s.; tailors, 15s. 6d.; shoemakers, 13s.; weavers, 22s.; painters, 17s. 6d.; helps, and all kinds of unclassified daily workmen, 8s. to 10s. 6d. The earnings, however, of some of the workmen are subject to great fluctuations, according to the season. In the months of May, September, or October, a first-rate carpenter might contrive to earn 26s. a week, and first-rate bricklayers 30s. Tailors may, at times, earn 22s.; shoemakers up to 17s. 6d.; smiths up to 26s.; all must be first-rate hands by piece-work, and for Copenhagen only. All things considered, where the English operative is earning 20s. a week, the Dane may be getting 13s., the English 36s. wage answering to 19s. or 20s. in Copenhagen. Provincial rates are somewhat lower than those in the capital, and the workman is, on the whole, not so well off. The provincial artisan not unfrequently lives with his master; a carpenter would, under this system, receive 9s. a week with board and lodging. The village artisans are generally agriculturists, with three or four acres of ground, leasehold or freehold.

Danish victuals are inferior to English victuals. First-rate meat cannot be procured in Copenhagen at any price. Rye bread is universally eaten, and it seems to be an unobjectionable kind of food, most Englishmen, prejudice apart, would prefer it to town-bakers' bread. Danish cookery is inferior and wasteful. The workmen's wives are not good economists, they generally buy at the worst shops, purchasing very small quantities at a time, such as a ¼ lb. of butter, a pennyworth of potatoes, and so forth. The operative's indispensable clothing costs him from 3*l.* to 4*l.* a year. When he has the means he is not satisfied with making a respectable appearance suitable to his position, but is anxious to dress so as to pass for a man of independent income on Sundays and holidays.

HYDE PARK CORNER.

"Something must be done," no doubt, before next season, to relieve the pressure of traffic at Hyde Park corner and Grosvenor-place. Although, as Mr. Sidney Smith would have said, we may not yet have heard of a Bishop being killed there, not only the episcopal bench but all other classes of her Majesty's subjects are in danger of such a catastrophe.

"Something must be done!" Quite true. But, by all means, let the "right thing" be done. It is a matter for congratulation that, even at the last hour, the Government scheme is not to be carried out "without the most careful consideration." This was the effect of Lord Henry Lennox's reply to Mr. Adam in the House of Commons the other night.

The Government scheme is,—to form a sunken road, or what, in railway phraseology, would be termed an open cutting, from a point opposite to Hamilton-place, across the Green Park, passing under Constitution-hill (which is to be raised to allow of the subway) and running into Grosvenor-place, at an ugly angle not even opposite to Halkin-street, but some yards above it. Very unwillingly we are obliged to say we do not like the scheme. The arrangement would not only be unsightly, but the open cutting would effectually cut up a pretty and much used part of the Green Park, and would leave the useless corner of the park, close to the reservoir, in its present ugliness. It would also make irremediable the dangerously narrow neck of Grosvenor-place; for, if Constitution-hill is to be heightened, Grosvenor-place can never be widened. The subway would also, we fear, involve nuisances of many kinds.

The Duke of Westminster's counter scheme of forming a broad descent from Piccadilly down to Grosvenor-place by throwing open ground on the east side of the arch, leaving that erection in the middle of the roadway, seems to us far more promising. Besides the immense public convenience which would be secured, the architectural effect of this scheme would be grand; and if, in connexion with it, the ugly wall of the Queen's garden, which bounds the eastern side of Grosvenor-place, could be replaced by a handsome wall, or by pretty railings worthy of the locality, with a bank inside, an urgently demanded public improvement would be carried out. London is greatly indebted to the Duke of Westminster for improvements which his Grace has carried out; and, on this ground alone, any improvement proposed by him is entitled to special consideration. The Duke has offered to contribute 3,000*l.* towards the widening of the neck of Grosvenor-place, and, no doubt, he and his tenants in Grosvenor-place would also contribute largely towards the improvement of the wall lower down in Grosvenor-place. At all events, it will be inexcusable if the Duke's project, backed up as it is by a handsome contribution, do not receive the most careful consideration from instructed and competent persons. By an alteration of the gradient, the road of Constitution-hill might still pass under the arch, for State purposes, if desired; and a road could be carried, on the level and not through a cutting, from opposite to Hamilton-place across the Green Park to Grosvenor-place.

We cannot resist a strong conviction that the sub-way as proposed would be a mistake, and one of no ordinary bigness.

THE PHAROS AT DOVER, AND THE REMAINS ON THE WESTERN HEIGHTS.

The following is the communication addressed by Mr. C. Roach Smith to Mr. Mackeson, the mayor of Hythe, and read by the latter at the recent joint meeting there of the Royal Archæological Institute and the Kent Archæological Society:—

In forwarding you Lieutenant (now Captain) Peek's plan of the Pharos, I may as well extract what Stukeley, in his Itinerary (1722) says about it. He was a good draughtsman; and in such matters may be relied on for accuracy. It is only in some of his theories he is not always to be relied upon.

"One part of the fortifications consists of a large circular work, in which stands the old church. There is not much doubt to be made that upon this hill was a *castrum* of the Romans, like that at Richborough, to guard this haven. The church was built in the first times of Christianity, out of part of the Roman ruins, whence there are huge quantities of Roman bricks laid into the work; the arches are entirely turned with them; the corners and many parts, both within and without, are built up therewith; and the remainder is of stone, originally cut by the Romans. But the greatest curiosity here is the *Pharos*, or Roman watch-tower, standing at the west end of the church. Notwithstanding it is so much disfigured by new daubing with mortar, casing, and mending, I discovered its primary intention the first minute I saw it; and sent the three prints of it, which I here present the reader, to Monsieur Montfaucon, at the instances of my most honoured lord, the Archbishop of Canterbury. I was in hope they would have been more useful to that celebrated author; for therein, at least, he might have found that the building which he first took for a *Pharos*, and whereof he gives us four views, is truly the tower of the church we were talking of. The description of this curious work, which I believe the most perfect of any left, in short is thus."

"In the forty-seventh plate we have shown the ground-plot upon which it is formed, and a section of the work, whence we may readily observe that the design is simple, but admirably contrived for its use and purpose; the base is octagonal without; within, a square; but the sides of the square and octagon are equal; viz., 15 Roman feet, which reduces the wall to the thickness of 10 feet. In this manner it was carried up to the top, which was much higher than at present; but it retires inward continually from all sides, with much the same proportion as an Egyptian *obelus*.* Upon four of these sides there are windows narrow, handsomely turned with a semicircular arch of Roman brick, 6 ft. high, so that the outside of it appears as in our forty-sixth plate.† The door to it is on the east side, about 6 ft. wide, very well turned overhead, with an arch made of a course of Roman brick and stone alternately, 14 ft. high. All the stones of this work are of a narrow scantling; and the manner of the composure, throughout, is perfectly the same as that lately described at Richborough Castle; there are, first, two courses of this brick, which is level with the bottom of the windows; then seven courses of hewn stone, which mount up to the top of the windows; then two courses of brick, seven of stone, alternately, to the top; every window by this means reaching to a stage or story. There are five of these stages left; the windows are visible enough to a discerning eye, though some be stopped up, others covered over, others have modern church-like windows of stone put in. I suppose the inside was entirely filled up with a staircase; the height of what is left is 40 ft. I believe there were 20 ft. more originally; and the whole number of windows on a side was eight. This building was made use of as a steeple; and had a pleasant ring of bells in it, which Sir George Rook procured to be carried away to Portsmouth. Since then the office of the Ordnance, under pretext of savingness, have taken away the lead that covered it and left this rare piece of art and masonry to struggle with the sea, air, and weather. Mr. Degg gave me a coin of Diocletian, found here. The Erpinghams' arms are patched up against one side of the Pharos, being two bars and a canton, so that I suppose it was repaired in Henry V.'s time, Lord Erpingham then warden of Dover Castle. I have heard there is another such Pharos at St. Andrews, in Scotland. Such a Roman *Pharos* is at Damiata, in Egypt, the view of it in 'Le Brun,' plate 70, letter A."

"On the other high cliff, opposite to this, beyond the town, has been another *Pharos*; some part of the bottom part of it is still left, called the Devil's Drop, from the strength of the mortar: others call it Bredonstone. Here the new constable of the castle is sworn."

"Upon another rock over against this, and almost of equal height, there are the remains of some very ancient building. One author, upon what grounds I know not, has called it 'Cæsar's Altar'; but John Twine, of Canterbury, a learned old man, who in his youth had seen it almost entire, affirmed to me that it was a watch-tower to direct sailors by night-lights (some part whereof is yet remaining, called Bredenstone). Such another there was over against it at Bologne in France," &c. (Gibson's "Camden," p. 250).

Thus far Stukeley. The "circular work" he speaks of is indicated in a plate by a turret; and the core of the wall (for such it must have been) is in part yet to be seen. But whether this was Roman work is a question easily solved by spade and pickaxe, the only interpreters we can appeal to with confidence in such cases. If there be such a Pharos at St. Andrews, in Scotland, it stands a reproach to the archæologists of the last century and a half that they have had so little enterprise as to allow it to remain undescribed. And another on the coast of Flintshire, recorded by Pennant, and engraved for an article by the late James Yate, M.A., for Dr. Smith's "Dictionary of Greek and Roman Antiquities," also of questionable origin, remains unchallenged. The appearance of the latter, as shown by the woodcut, begets mistrust; but it is remarkable that up to the present day we have no decided authority as to whether they are ancient or Mediæval. The name *Bredan*, I suppose, merely refers to the size of the stone, which if it be Roman masonry, would readily respond to a slight excavation, and reveal its real character and origin.

Although part of the Pharos may have gone to help build the church it is obvious that the great mass of Roman materials employed was taken from other buildings. There is yet to be seen to the N.E. of the Pharos, and close to the church, a large block of Roman masonry, which must, from its size and weight, be in its original site though overturned, apparently from undermining. To this I call your attention, and to the ramparts.

A few years ago a Colonel in command of the Royal Engineers, with happy inspiration, resolved to clear the Pharos of the surrounding accumulation of earth, the modern insertions of brickwork, to open the entrance, and to remove the modern wall connecting it with the church. This was done, mainly under the superintendence of Lieut. Peek, to whom we are indebted for the plan, and for the accompanying notes. He remarks:—"The removal of the masonry from the upper window on the south side has disclosed the Roman work in a perfect state. It presents two features of interest: one, a low, dwarf, parapet wall of Roman tile across the external opening as if for the security of a watchman observing the French coast, of which no traces are to be found in the other windows; and is also remarkable for the manner in which the reveals of the window are stopped short of the external face, an impediment which may perhaps have been adopted to hide the awkward effect produced if the external face were carried up in one uniform instead of perpendicular. As far as the different stories were concerned, I found an opinion rife that the original building had been square; and that its present octagonal

* *Obeliscus.*

† Are there windows on four sides? I think not. They cannot be properly termed *narrow*.—C. R. S.

form was due to the action of time in rounding off the corners, and to the improvement effected by the Mediæval restorer; but on digging down in one of the inner sides, the edges of the courses of Roman tile in a set-off of the foundations following the lines of the octagon disproved the supposition."*

"As far as I can judge, the original tower consisted of five stories, lighted on each of the cardinal sides by windows 2 ft. wide, except on the upper floor, where the width was increased to 4 ft.; and the ground floor, where an opening to the south, 4 ft. wide, served as a doorway. The south side differed from the others in having no windows on the alternate floors; and an increase of width to 3 ft. given to the middle window. A prominence is thus given to the south side, which may have some connexion with the fact that it looks directly on Cape Grisnez, the nearest point of France, if we suppose the use of the building as a watch-tower to have been intended in the original design. Particularly as the east and west sides are thus directly facing the two adjoining military stations, Richborough and Hythe (Lymne), which, though not directly in view, could, no doubt, give a signal by a beacon fire of any approaching enemy."

"The material used throughout is tufa, exactly similar to that found in the valley below, near Buckland, banded together by courses of tile every 4 ft.; and with a view, as I suppose, of drying the great mass of masonry, perforated by air-holes from inside to outside, at irregular intervals."

"The Mediæval reconstruction consisted in covering over the lines of the Roman Pharos with a casing of stone and squared flints, and blocking up the windows so as to form a dark tower, divided into two stories, which, from its doorway facing the west door of the church, may have been applied to the purposes of a crypt, or as a temporary resting-place for the bodies of persons to be buried in the graveyard adjoining. Above this, a light ornamental belfry was added. The sudden decrease in size at the bottom of the superstructure is probably the result of the upper portion of the Roman work having suffered from time, and being unfit to bear the additional weight, and having been, therefore, trimmed.—Yours very truly,

(Signed) W. Emerson Peek.

February 2nd, 1872.

To C. Roach Smith, esq."

We must all be deeply obliged to Captain Peek for the perseverance and skill he has shown, and for communicating the result so good-naturedly. I have only, in addition, to draw your attention to the very superior manufacture of the tiles. They are of very unusual size, and of superior workmanship, where all is good. In the Dover Museum is a perfect specimen, asserted to have come from the Pharos (if I mistake not), I have also figured one in my "Richborough, Reculver, and Lymne," copied from a plate in the "Archæologia," vol. v., for the sake of an inscription. No doubt the four circles upon it are projections, as in that in the Museum, reversed by error of the original artist. The tiles in the Pharos do not appear to be stamped. That referred to was from a building in Dover, probably of later date. This stamp of the makers, CL.BR., which is the only inscription found at Dover, occurred rather frequently upon the tiles found at Lymne. It refers to the British *Classiarii*, or Marines, whom we also find, at some unknown period, in the North of Britain (see Dr. Bruce's "Lapidarium Septentriale," p. 199).

As Montfaucon and the Pharos at Boulogne have been referred to above, it may be in place here to insert a note I made some time since.

The Pharos at Boulogne is described pretty fully by Bernard de Montfaucon in the "Mémoires de Littérature tirés des Registres de l'Académie Royale des Inscriptions et Belles Lettres" (1718 to 1725). Amsterdam, 8vo., 1731, tom. ix., p. 278. It was octagonal. Each side was, according to Bucherius, 24 ft. to 25 ft.,—its circuit therefore, 200 ft., and diameter, 66 ft. It had twelve entablatures, or kind of galleries, as is seen from without, not comprising the basement, concealed by the small fort built by the English, in 1545, around it. Each entablature formed by the thickness of the wall below was a sort of small gallery, of 1 ft. 6 in. wide. Thus this Pharos, like others, diminished in its stages. It was called *Turris ordens*, or *Turris ordensis*, probably from *Turris ardens*. The people of Boulogne called it *La Tour d'Ordre*. Eginard says that Charlemagne (A.D. 811) restored it, and placed a night-light upon its summit, as a guide for ships. Being undermined for stone, both the Pharos and the fort fell on the 29th of July, 1644.

C. Roach Smith.

* The octagon was a favourite form of the Romans, and occurs very frequently in buildings, in sculpture, and in ornamental designs, especially in the tesselated pavements. The Pharos at Boulogne was octagonal.—C. R. S.

CRYSTAL PALACE SCHOOL OF ENGINEERING.

The summer term of this school was brought to a close on Saturday last, when, as usual, a number of the friends of the students and others interested in the school were invited to an inspection of the students' work, in the drawing-office and the different workshops, and to witness the presentation of the certificates awarded by the examiners, who, on this occasion, were Messrs. Richard Hassard, C.E., and William Jacomb, C.E. Colonel C. Brisbane Ewart, C.B., R.E., presided at the closing meeting, and presented the certificates awarded to the students.

The first term of the three into which the year is divided is spent by the students in the drawing-office, in which a large number of drawings were shown, some of them of a high degree of excellence. The subjects relate to mechanical and civil engineering, including structures of various kinds. On entering the drawing-office the attention of the freshman is directed to some such document as the following imaginary "order":—

"Please design for me a queen-post roof, of 40 ft. span, the principals of which are to be 6 ft. apart from centre to centre. The angle of the roof is to be 30°, and the rise of the tie-rod in centre 2 ft. The covering is to be slate, on ¾-in. boarding; and there are to be two purlines of deal on each side, resting on the struts. The principal rafters are to be of T-iron, as also the struts. The general rafters are to be of wood, placed 1 ft. apart from centre to centre. The elevation of the principal is to be to a small scale, and details are to be shown of the connexions of all the parts."

Similar "orders" are given to the students for horizontal expansion engines, strong double-purchase crabs, hollow plunger pumps, and other objects within the domain of mechanical engineering. The students' replies are given by the production of the required drawings, accompanied by specifications and detailed estimates. The next term is spent by the student in the pattern-shop and foundry. The patterns exhibited were of a very miscellaneous character, some of them being for the trade. Many of them were beautifully made, and seemed likely to "draw" well. The third term is devoted to the fitting and smith's shop. In the fitting-shop the effective machine tools of the school were shown at work, driven by a horizontal engine of three horse-power, nominal, made by the students. Since the opening of the school, at the beginning of 1873, six of these engines have been made by the students. During last term they have made one engine and part of another. The civil engineering course requires attendance for two additional terms.

After the inspection the company assembled in the lecture-theatre of the school, Col. Ewart presiding. Mr. F. K. J. Shenton read the examiner's report. Thirty-one of the students were eligible to go in for examination upon the subject of "Railways: their Construction and Appliances." Of these twenty-six passed and received certificates, all but one of the number receiving a second certificate for merit in the particular department of the course he had been passing through during the term. The highest number of marks attainable for the "Railways" examination is 232. Mr. A. Brook was first with 201 marks, and had also a certificate for fitting; A. Marshall was second with 200 marks. The remaining twenty-four students were placed as follows, omitting the numbers of their marks:—H. E. Read, and second for drawing; C. B. Penlington, and for drawing; W. J. Bean, and for fitting; E. A. Thomson, and second for fitting; S. Firth, and for patterns; R. Moyes, and for patterns; H. Gay, and first for drawing; J. Mayhew, and second for patterns; W. B. Dutton, and for fitting; J. Suart, and for patterns; E. A. Brine, and first for fitting; F. S. Richardson, and first for patterns; L. Ewing, and for drawing; A. W. Payne-Gallwey, and for drawing; H. le G. Solly, and for drawing; A. H. Adams, and for fitting; A. W. N. Lewis, and for Civil Engineering, first term; H. Fenhoulet, and for drawing; J. H. Preston, and for fitting; F. A. Wythes, and for fitting; W. H. Payne-Gallwey, and for drawing; H. S. Vogan, and for patterns; H. Field, and for drawing; and P. W. Foster, "Railways" Examination, and for patterns. Thirteen certificates were awarded for drawing. In addition to the students named in the above group, certificates were awarded to J. E. Corker, A. G. Hudson, S. Hewitt, and E. H. Wallick. The following were, in addition to the students already named, included in the eleven to whom certificates were awarded for work in the pattern-shop and foundry:—P. Baylis, A. Emery, E. Wilson, and H. Barnett. For work in the fitting and smith's shop, certificates were awarded to ten students, including, in addition to those already named, S. P. Sheraton, and T. S. Tilley. In the Civil Engineering section, first term, the following certificates were awarded for general surveying, and the preparation of plans and sections for Parliamentary deposit:—H. J. Saunders, F. Fitzherbert, G. E. Bokenham, H. Edwards, and A. W. N. Lewis. For the same section, second term, for calculation of strains, and the preparation of general and working plans, specifications, and estimates of a railway and dock, the following certificates were awarded:—M. Harding and G. Marston, equal firsts; W. H. Fisher, and A. H. Wilson, second and third respectively. The Examiners conclude their report by saying:—"We have much pleasure in stating that the general proficiency of the students is evidence of the practical value of the course they are passing through, which should fit them for commencing their duties in the several branches of civil and mechanical engineering; we further express our satisfaction in the general training of the students, which reflects great credit on your able principal, Mr. J. W. Wilson."

After presenting the certificates, Colonel Ewart addressed the company congratulating the directors on the prosperity of this most useful school, that was just what was wanted to equip young men for entering upon the professions of civil or mechanical engineer.

Mr. J. W. Wilson, the principal, in replying to a vote of thanks, said he felt personally grateful to the examiners for the time and attention they had bestowed. Mr. Hassard had been at the trouble to work out all the questions for himself; that made the awards of so much higher value. He spoke in terms of special approbation of several of the students; amongst others, "young Vogan," who had been awarded two certificates, and who was so short as to have to stand upon a box to enable him to work at the bench. Mr. Wilson gave some interesting particulars as to the positions and occupations of some former pupils of the school.

THE INHABITED HOUSE DUTY AND POOR RATE.

WHAT CONSTITUTES A "HOUSE"?

The Court of Exchequer has just ruled that it is legal to charge house-duty and poor-rate on the same house on two distinct systems. The question came before the Court in the case of "The Attorney General *v.* The Westminster Chambers Mutual Tontine Association." The Association own the "Westminster Chambers" in Victoria-street, Westminster, a row of seven blocks of buildings, having seven principal entrances. Each of these blocks is divided into two ranges by an internal staircase, which has only one door at the principal or street entrance, and each block is in its internal arrangements structurally divided into different tenements or suites of rooms, which are quite distinct from each other, like chambers in the Inns of Court, and they are let and occupied separately as chambers, offices, or residences. Each tenement or suite of rooms has an open door opening on to a staircase common to all, and also an inner private hall or passage, a water-closet, and a lavatory. There are no means of communication between those tenements or suites of rooms other than the staircase common to all. Nearly all the tenements or suites of rooms are let and used as offices or chambers for business purposes, and they are locked and unoccupied during the night. A few only of the tenements or suites of rooms in three of the blocks are used as residences.

The outer or street door to each block of building is kept locked at night, and a porter, who is appointed by the Association, resides in a distinct set of rooms in the basement of each block of building, and has a key of and access to the suites or sets of rooms in such building in the occupation of the tenants as their servant.

The Association provide gas for the staircases, halls, and passages, and water for the entire buildings, and pay all rents and taxes in respect thereof, charging their tenants higher rents in consequence.

Power is given to the defendants to demise or sell any set of apartments separately from the rest of the house. None of the suites of rooms have been sold, but the greater number have been demised for seven, fourteen, or twenty-one years.

Each block is not inserted in the valuation list prepared under 32 and 33 Vic., c. 67, as one hereditament; but each of the 117 tenements or suites of rooms of which the seven blocks consist is treated as a separate hereditament and assessed accordingly, the name of the tenant of each such tenement or suite being inserted as the occupier and separately assessed to the poor-rate. It has already been held, by the decision of the Court of Queen's Bench, that each tenement or suite was, for the purposes of a poor-rate, a separate rateable hereditament. Many of the 117 tenements or suites are unlet, and some never have been let, and therefore the defendants derive no rent therefrom. The Crown contended (1) that for the purpose of inhabited house duty the property should be assessed as several dwelling-houses only on the defendants as occupiers under 48 Geo. III, c. 55, schedule B, rule 6; and (2) that the value of each of the seven blocks was properly represented by the aggregate sum of the values which appear in the valuation list as those of the separate hereditaments occupied by the defendants' tenants.

The defendants contended (1) that each of the 117 tenements or suites should be separately assessed on the tenants under rule 14 of the above-mentioned schedule; and (2) that, if the Crown was right on the first point, then, since many of the tenements were unlet, and the values in the valuation list did not represent the annual value of the blocks to the defendants, the Crown ought to make a separate valuation on the defendants of each block under 32 and 33 Vic., c. 67, section 76.

The majority of the court, viz., Barons Bramwell and Cleasby, held that the Crown was right on both points; Chief Baron Kelly, however, held that the defendants were right on the first point.

The result of this decision is that each suite of rooms may be assessed for poor-rate separately, while each block of buildings, whatever the number of separate suites, is to be charged house-duty on the total value of the various suites.

INNER CIRCLE COMPLETION.

A "LITTLE BILL," passed in the expiring session' gives powers to the Metropolitan District Railway Company to make a short junction line at Hammersmith, which will connect the Midland and the South-Western Companies' lines with the District system, and give them access to the Mansion-house Station. This station, because of its being a "dead end," is already subjected to a crowded traffic, greater than it can well bear, an inconvenience that would be completely obviated by the completion of the inner circle, and the Mansion House being made a way-side station.

There can be little doubt that this short, inexpensive link at Hammersmith will be constructed at once, inasmuch as a few months, six at most, will suffice to make it. Its making, and the demonstration it would be, of important traffic advantages that it would place within the reach of the Midland and South-Western Companies, always provided that the circuit is completed, should make those companies the allies of the Metropolitan Railway Inner Circle Completion Company.

The Midland, by the completion of this link at Hammersmith, and the filling up of the gap between the Mansion House Station and the Liverpool-street Station of the Metropolitan line, would have a London circuit communication. The South-Western, at present almost shut out from the North side of the Thames, and from the City, excepting by transfer to the South-Eastern Company at Waterloo Junction, would then have independent access to the City, and to the Great Eastern, King's-cross, and St. Pancras Stations.

It is also interesting to notice that the making of the short Hammersmith link and the completion of the inner circle would provide the outer circle of railway communication round London recommended many years ago by a joint committee of Lords and Commons. This outer circle would touch, or pass quite close to, the following among many other important points:—Victoria Station, Westminster Bridge, Charing-cross Station, the Temple, Blackfriars Bridge, Mansion House Station, Cannon-street Station, Eastcheap, Fenchurch-street Station, Aldgate, and then, turning to the north and west, the stations of the East London, communicating with the Brighton and South Eastern systems, the stations of the Great Eastern, North London, and London and North Western in Liverpool-street and Broad-street; thence, northwards, to King's-cross and St. Pancras Stations, Camden-road, and Kentish Town, Haverstock-hill, Finchley-road, Cricklewood, Harrow-road, Willesden Junction, Acton, Hammersmith, and on to the starting point at Victoria Station. It may be readily apprehended that a completed railway communication connecting such important points with each other would be a great public convenience, that those who travel most will be the readiest to appreciate. The advantages, however, that seem so nearly within reach are contingent upon the execution of the short link of the Metropolitan District line at Hammersmith, which that company will doubtless make at once, as an important feeder to its traffic from the west. An essential and more important requirement is the completion of the inner circle by a junction of the Metropolitan and District lines at their present eastern termini.

The Metropolitan Company, it appears, intend to continue their line to a terminal station at High-street, Aldgate, that will be a spur from the inner circle completion line. Whether this extension will prove remunerative, if constructed, remains to be ascertained, but it would seem, to say the least, open to doubt.

THE CHAMPION ROCK BORER.

IT may interest your readers to have some statistical information about this compact and well-arranged rock-borer, which is the property of Messrs. Ullathorne & Co. A thoroughly good rock borer is one of the most important mechanical contrivances which can be conceived, and it has so many requirements that it is very difficult to meet them all, but I must say that I was very much pleased with what I saw, during the crucial trial of this little apparatus, which I had the pleasure of witnessing a few days ago.

The No. 2 size Champion Rock-borer, which I saw in action, weighs 1 cwt. 3 qrs., and is connected with a telescopic tripod weighing 3 qrs., so that it is very portable, stands steadily upon any uneven surface, and will work with equal facility in any position, vertical or horizontal. The drill or chisel used was a round steel bar, flattened at the lower end and brought to a V-edge. The drill is made fast to the reciprocating piston-rod of the apparatus by means of an ingenious expanding clip, which ensures the whole being concentric and firm. The piston is packed with Ramsbottom's steel rings. The motive power is either steam or compressed air, and is admitted under the piston, so as to raise it the required height, and is then transferred to the other side so as to cushion the blow and overcome the inertia when the stroke is made. The drill and piston are rotated slightly during the upper stroke, so that the nose of the tool drops in a different position each time, and it is so arranged that in case of an obstacle occurring so as to prevent this motion, a friction clip secures the apparatus the danger of breaking. The feed of the drill is regulated by an ingenious automatic action, which only works in proportion as the drill enters the material upon which it is acting. It works on the upward stroke only, and is so arranged that if neglected, and the screw becomes jammed, a friction bar will rotate, and thus a breakage be avoided. The valves of this apparatus are cylindrical, and partially rotate, the motion being imparted by a rocking saddle, actuated by a stud from the lower part of the machine; an external stud enables these valves to be moved by hand, so that the cylinder can be cleared of water at starting.

During the experiments which I made with this apparatus upon a very hard piece of Guernsey granite, I obtained the following results:—the diameter of the drill used was a little under 2 in. and made a 2-in. hole. The piston reciprocated with from 600 to 800 strokes per minute, and had at the back of it 45 lb. of steam, and in three minutes the distance the drill entered the granite was 12 in. The tool had a fair edge at starting, but was quite round and blunt when the hole was complete; this did not, however, seem to interfere with the effect produced, which I believe was entirely due to the concussion and rotation. When this experiment was completed a smaller drill, 1¼ in. was introduced, and this entered the granite 13 in. in two minutes and a half.

If I am not mistaken, we shall hear more of this little rock-borer; there is that about it which gives the impression that it is meant for work, and is what is called a likely tool; anyhow, it is well worthy of the consideration of engineers and contractors who are engaged in driving headings, making tunnels, or blasting.

J. W. WILSON,
Principal of the School of Practical Engineering, Crystal Palace.

THE PROPOSED SANITARY AND EDUCATIONAL EXHIBITION AT BRIGHTON.

IN connexion with the Social Science Congress, to be held at Brighton, from the 6th to the 16th of October next, it is intended to form, as on some previous occasions, an Exhibition of Sanitary, Educational, and Domestic Appliances. It will be set up in the Corn Exchange, adjoining the Dome of the Pavilion, Brighton.

The object of the Exhibition, as heretofore, is to bring under the notice of the public generally, and particularly those who are interested in the social, sanitary, educational, and economical questions, the latest scientific appliances for improving the public health, promoting education, and advancing social economy. These will be classified under the following heads, viz.:—

1. *Warming, Ventilation, and Lighting*, which will comprise registers, grates, stoves, valves, flues, furnaces, boilers, fuel economisers, steam warmers, hot air and water systems of warming, means of ventilation, regulators for preventing smoke and waste, air reservoirs, gas reservoirs and apparatus; lighting by candles, gas, oils, mineral oils, lamps, lanterns, lamp pillars, gaseliers, jets, reflectors, conductors, with drawings and plans, &c.

2. *Domestic Appliances and Economic Apparatus*, to consist of stoves, ranges, kitcheners, and ovens (heated with gas or otherwise) for roasting, baking, or boiling, &c.; natural and artificial fuel, economisers of fuel, food manufacturing machines, laundry machines and cleansing implements, household ware, culinary utensils, sewing machines, and articles of domestic utility and household economy; means of preventing injuries and diseases which specially attach to industrial occupations.

3. *Sanitary Architecture and Appliances*, for outward and interior ornamentation, including cisterns, lavatories, baths, closets, filters, fountains, indicators, paving and roofing materials, ornamental bricks and tiles, garden ornaments, terra-cotta, selenitic compounds, cements, plaster, concretes, slag, stoneware and clayware, building materials, models of dwelling-houses, cottages for the poor, &c.

4. *Sanitary Engineering and Methods of Disinfecting.*—All things connected with the supply of water, sewerage, drain pipes, tubes, valves, sinks, taps, traps, troughs, closets, commodes, urinals, filters, water-waste preventers, sewage and drainage contrivances, disinfecting apparatus, deodorants, antiseptics, &c.

5. *Food and Clothing.*—Specimens of food and confectionary, food for adults and children, conservation of food, condensed fluids, preserved meats, fruits, vegetables, and other articles of general consumption; beverages, analyses, and specimens of adulteration in various forms; articles of dress and clothing best adapted for men, women, and children, in all weathers; sanitary cloths, felts, waterproofs, India-rubber goods, and hygiene in clothing generally; beds and bedding for hospitals and tents, and appliances for the sick chamber and for the comfort of invalids; life-buoys, swimming-belts, and fittings for protection of life from drowning, and means for the prevention of accidents from fire, water, and other causes.

6. *School Furniture and Educational Apparatus*, comprising models and plans of school buildings; school desks and furniture, instructive toys, gymnastics, maps, drawings, books, stationery, prints, figures, and other articles used in teaching; school clocks and decorations.

The exhibition will be opened with an address, to be delivered in the dome, to which the public will be admitted free; and lectures on the various classes of exhibits are being arranged for.

The regulations and any desired information may be obtained from Mr. James Robinson, of 1, Adam-street, Adelphi.

We cordially invite our readers, whether for their own sake as manufacturers of such appliances or as desirous of the general good, to see in what way they can best aid in rendering this exhibition valuable.

New Law Courts for Liverpool.—A communication from the First Commissioner of Works was read on the 4th inst. before the Liverpool Town Council stating that so soon as the estimates for the next financial year were brought forward, the Board of Works would consider the erection of the proposed new Law Courts at Liverpool. The site chosen is that at present occupied by the Victoria Hall, where the Moody and Sankey services were held.

CONCRETE SLAB COTTAGES.

The economical construction of cottage dwellings is a subject which has of late years received a great deal of attention, but it must be admitted that the practical results hitherto attained have not been sufficient to satisfy either the philanthropist or the capitalist. It is essential to a successful solution of this question that a labourer's or artisan's cottage should fulfill the following conditions, viz.:—1. It should contain the requisite accommodation for a man and his wife with a family of say four or six children, separate sleeping-apartments being provided for the boys and girls. 2. The cost of construction should be so moderate as to admit of the cottage being let at such a rent as can be conveniently paid by the tenant, and yet yield a fair return for the outlay. 3. The mode of construction should be such as to avoid the necessity of frequent repairs. To these three principal requirements others of minor importance may be added, such as facility of construction without the aid of skilled labour, and also that the external appearance of the structure should be such as to please the eye without necessarily involving any great cost for ornamentation. It has been abundantly proved that proper accommodation for a labourer and his family cannot be provided at a suitable rent in cottages constructed in the ordinary manner, and of the materials usually provided for the purpose. 250*l.* appears to be the ordinary estimate for a pair of brick-and-timber-built cottages, with slated or tiled roofs, and although this sum may be considered a moderate price for the work done, there can be no doubt that it is in excess of what can usually be afforded for the purpose. When from the probable rent to be obtained are to be deducted rates and taxes and the cost of repairs, it will be evident that cottage-building, under such conditions, is not likely to become a very attractive investment.

The construction of the walls of cottages in concrete instead of brick has of late somewhat reduced their cost, but the use of this material involves the construction or purchase of a somewhat costly apparatus, and the walls, when erected, must be stuccoed, thereby requiring the aid of a skilled artisan.

By a plan recently invented and patented by Mr. W. H. Lascelles, of Bunhill-road, London, he professes to be able to dispense almost entirely with skilled labour; the assistance of a carpenter only being required to set up the skeleton framing of the structure. The framework of the building is constructed of wood much in the same way as the framework of a timber-built or lath-and-plaster house, except that the vertical standards or quarterings are about 3 ft. apart, instead of 1 ft. 6 in. or less, as is usually the case in wooden houses. The walls are constructed of concrete slabs about 1½ in. thick, made of fine ashes, or breeze, or crushed coke, with a proper proportion of Portland cement. The slabs are made about 3 ft. long by 2 ft. wide, and are cast in moulds, iron rods being embedded in the concrete, to strengthen the slabs, which are faced on both sides so as to require no further finishing. The face of the mould may be so prepared that the outer face of the slab would look like wall tiling, and a suitable colour may be added to the concrete to assist in giving this appearance should it be desired. The slabs are rebated at their sides and ends so as to fit into each other, and they are fixed to the uprights of the wooden framing by means of screws, the joints being made tight with cement. The inner partition walls are made of the same kind of concrete slabs, finished smooth on both sides. The ceilings and floors are also made of the same kind of slabs, but finished smooth on one side only. The roof is constructed of similar concrete slabs. The slabs may be easily cut with a saw, so that they may be used to form the chimneys, which are pargetted on the inside.

The patentee claims that this mode of constructing cottages possesses many advantages, not the least of which is that a dwelling of neat and even ornamental appearance may be constructed at a cost much less than one built of brick in the plainest manner, as there is a great saving in the weight of material used, the mere carriage of which is an important item in some places. Another advantage is that increased space is obtained both in walls and in roof, and cleanliness is insured, as there will be no hollow spaces to harbour vermin. Dispensing in a great measure with skilled labour is also an important point; as one artisan to prepare and set up the wooden framework is the only skilled man that will be required; mixing the concrete, filling the moulds to form the slabs, and screwing the slabs to the wooden framework being simply labourers' work, in which they soon become expert. Mr. Lascelles is constructing several cottages at Croydon on his plan, which certainly appears to deserve inquiry.

TOOLS AND CONTRIVANCES USED IN HANDICRAFT.

The course of Cantor Lectures on "The Material, Construction, Form, and Principles of Tools and Contrivances used in Handicraft," delivered at the Society of Arts by the Rev. Arthur Rigg, at the beginning of the year, and referred to by us at the time, are now being published at the Society's "Journal." The first two, already issued, refer wholly to early nations, and will be found very interesting.

THE SHAFTESBURY PARK ESTATE COMPANY AND THE WANDSWORTH BOARD OF WORKS.

The Shaftesbury Park Estate Company and the Wandsworth District Board of Works are again at issue respecting the drainage of the company's houses, and the Board now threaten to cut off the connexions made with the sewers. It may be remembered that the houses on the estate were originally drained at the back, which the Board objected to, and the result of proceedings in Chancery taken by the company to prevent the Board interfering with the drains was, that the company were ordered to conform to the Board's regulations as to drainage. Not having done so, the company were last week desired to attend the meeting of the Board to show cause why the connexions with the sewers should not be cut off. Mr. Longcroft attended on behalf of the company, and stated that any alteration would greatly inconvenience the occupiers, and he suggested that some arrangement should be entered into between the company and the Board. Whereupon the chairman stated that it was the unanimous decision of the Board that the drainage must be in front of the houses. He added that everything that could be done had been done by the company to oppose the District Board, by the filing of bills in Chancery, and going before the Metropolitan Board of Works, and the company now came to the District Board and asked them, after the decision given, and after all the trouble they had been put to, to alter their determination. The answer of the Board simply was, that the order to disconnect the drains must be carried out. The effect of this decision will necessarily involve the reconstruction of the drains on the estate, and a large expenditure. Why were not the proper inquiries made in the first instance?

OLD BROMPTON, NOW SOUTH KENSINGTON.

We propose recalling another visit to what was lately known as Old Brompton.* Wending our way from the head of the Grosvenor Canal, the site of which is now spanned by the iron ribs of the Victoria Station, we cross some of the land appertaining to Ebury Farm, to the king's private road, and so on to the elbow of the road which crossed the Tybourne brook, whose meanderings might be traced through its sedgy banks on the site of the present Cadogan-place.

From the partially-built Sloane-square, we turn down a narrow lane of rustic buildings till we reach the back of Colville's nursery gardens on the left, and Blackland's house on the right. The fields of Box Farm, and the open Chelsea Common are before us, and the present Marlborough-road, at that time a country lane, brings us to the Admiral Keppel Tea-gardens. Hence, by the narrow lane with the pleasant garden-grounds and hedge-rows on either side of us, we arrive at Old Brompton at the very spot where the South Kensington train now lands its passengers.

The long country ramble, occupying some half to three-quarters of an hour, has been pleasant enough. The birds carol in the air, or chirp in the hedgerows, and sweet odours fall upon the sense in the freshly-mown grass, or from the blossoms in the gardens. The general business of life was slower certainly then than at present, when the return-ticket is available in a quarter of an hour perchance, and the same business is transacted within the sixty minutes, which in the old time would have occupied half a day.

We will not pause however to inquire if the general amenities of life have suffered by the change, or the artificial gained strength in our constitutions by that intimacy with the grim genius whose food is coal and water, whose pulsations are in the piston-rod, whose breath is steam, and whose scream is a lively imitation of sensation. We will defer moralising upon the abuse of the boon which genius gives to man, or it would bring us to the old old story of "Midas" over again. We will at present take things as we find them, and we are in the neighbourhood of the collection of the art-treasures—on the very ground which but a few years since held the largest collection of natural growth and artificial culture in the country, the proprietors of which were Messrs. Loudon & Wise. When enjoying the well-cooked chop in the artistic grill-room of the South Kensington Museum, and whilst noticing the excellent arrangements and agreeable accessories to comfort and convenience, we are surprised at the small space of time that has passed since this site formed a portion of walled-in private grounds in the occupation of a private gentleman, although of public name (Greenwood), the partner in the well-known firm of army agents and bankers, Messrs. Cox & Greenwood, Craig's-court, Charing-cross. It was here that the Duke of York and other celebrities of the times had been entertained.

From the year 1681, fifty-six acres of land, extending from the Kensington-road to the boundary of these private grounds in Old Brompton were devoted to horticulture. Curiously enough, the present Horticultural Gardens of South Kensington occupy the site of those once maintained by Loudon and Wise, whose collection of all sorts of trees and shrubs was spoken of by Evelyn with such eulogy, and whose artistic adornments at Kensington Gardens evoked the praise of Addison. The stock of plants and roots was so extensive, that, valued at only one penny each, it amounted to the sum of 40,000*l.* It was in those gardens that the gilly-flower was cultivated to such perfection as to obtain for it the well-known name of the Brompton Stock. The site of Trinity Church and Brompton-square were all market-grounds,—in the time when Farren, Mrs. Faucit, John Reeve, and Yates (all inhabitants of this locality subsequently) were young people, for Miss O'Neill, Mrs. Siddons, and John Kemble had disappeared from the play-bills, and Kean and Young had occupied the attention of the Town; nevertheless, the old names took precedence in the remembrance of the playgoer. But of Brompton Park Nursery, perhaps, more might be said than of any other in the kingdom. For 170 years it had flourished in all its beauty. It had been spoken of by two of the most renowned men of the time,—men as amiable as excellent, and men of extensive power and genius. That half-mile of wall grew the finest of vines, and they had thrown out tendrils to the soft summer air, and had withstood the winter frost undisturbed through all the stirring time of revolutionary action even before the weak and cruel simpleton James had been hurried unceremoniously from Whitehall by his son-in-law,—even to the change of dynasty from the house of Stuart to that of Hanover,—even to the period of the Great World's Fair in 1851, when the moral revolution in society became greater than any other which had preceded it.

To part with this old nursery was to part indeed with an old friend of many associations. Close adjacent was the nursery of Mr. Kirke, whose careful cultivation figures forth in many a number of the "Botanical Register," published in the year 1815. The editor of that journal of horticulture was Sydenham Edwards, whose grounds were in great favour at the period, and occupied the space which the present Hospital for Consumption and Diseases of the Chest, with the streets adjacent, has long since covered. These grounds, which extended from the Fulham-road to Old Brompton, remained much the same till 1844, when the before-mentioned Hospital was the first intimation of an altered site.

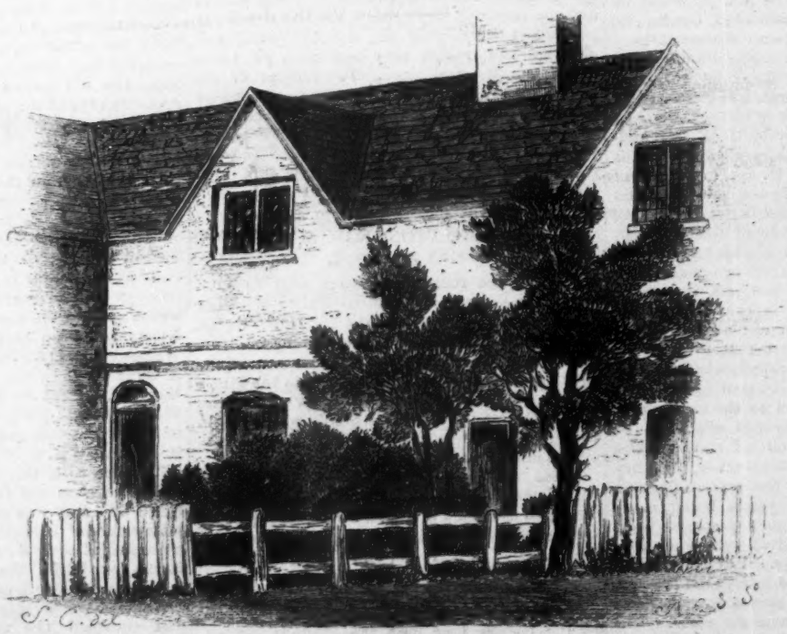
We must remain, however, in the Old Brompton-lane a little longer, so narrow at the Bell and Horns that you might fairly jump across it, with the elms and limes, and poplars and aspen boughs forming a green vista to look down from the hot and dusty Fulham-road. One mile from Hyde-park-corner in this suburb and you were shut away completely from the bustle and noise of the town, and had the sweet odours from the strawberries in the early morning, as the women passed you with their baskets on their heads, from the neighbouring grounds.

That most agreeable novelist, and master

* See vol. xxxii., p. 828.

OLD BROMPTON, NOW SOUTH KENSINGTON.

View of the Old Brompton-road, near the "Hoop and Toy," as seen from Onslow-terrace in 1833.



Part of Methwold's Almshouses (1870).

of literature, the late Lord Lytton, gives a very pretty picture of this suburban locality, in his novel of "Godolphin." Though slightly satirical, it was perhaps applicable to the period. "Lord Falconer rattled on, as they drove along the brilliant streets, through a thousand topics, of which Godolphin heard as much as he pleased; and Falconer was of that age and those spirits when a listener may be easily dispensed with. They arrived at a little villa at Brompton; there was a little garden around it, and a little bower in one corner, all kept excessively neat, and the outside of the house had just been painted white from top to bottom, and there was a verandah to the house; and the windows were plate-glass with mahogany sashes, only here and there a Gothic casement was stuck in by way of looking 'tasty,' and through one window on the ground-floor, the lights shining within showed crimson silk and gilded chairs, and all sorts of finery. Louis Quatorze in a nutshell! The reader knows the sort of house as well as if he had lived in it. Ladies of Fanny Millinger's turn of mind always chose the same kind of habitation. It is astonishing what a unanimity of taste they have; and young men about town call it 'taste' too, and imitate it in their own little *tusculums* in Chapel-street." "After having threaded a Gothic hall 4 ft. by 8 ft., and an oval conservatory with a river god in the middle, the two visitors found themselves in the presence of Fanny Millinger."

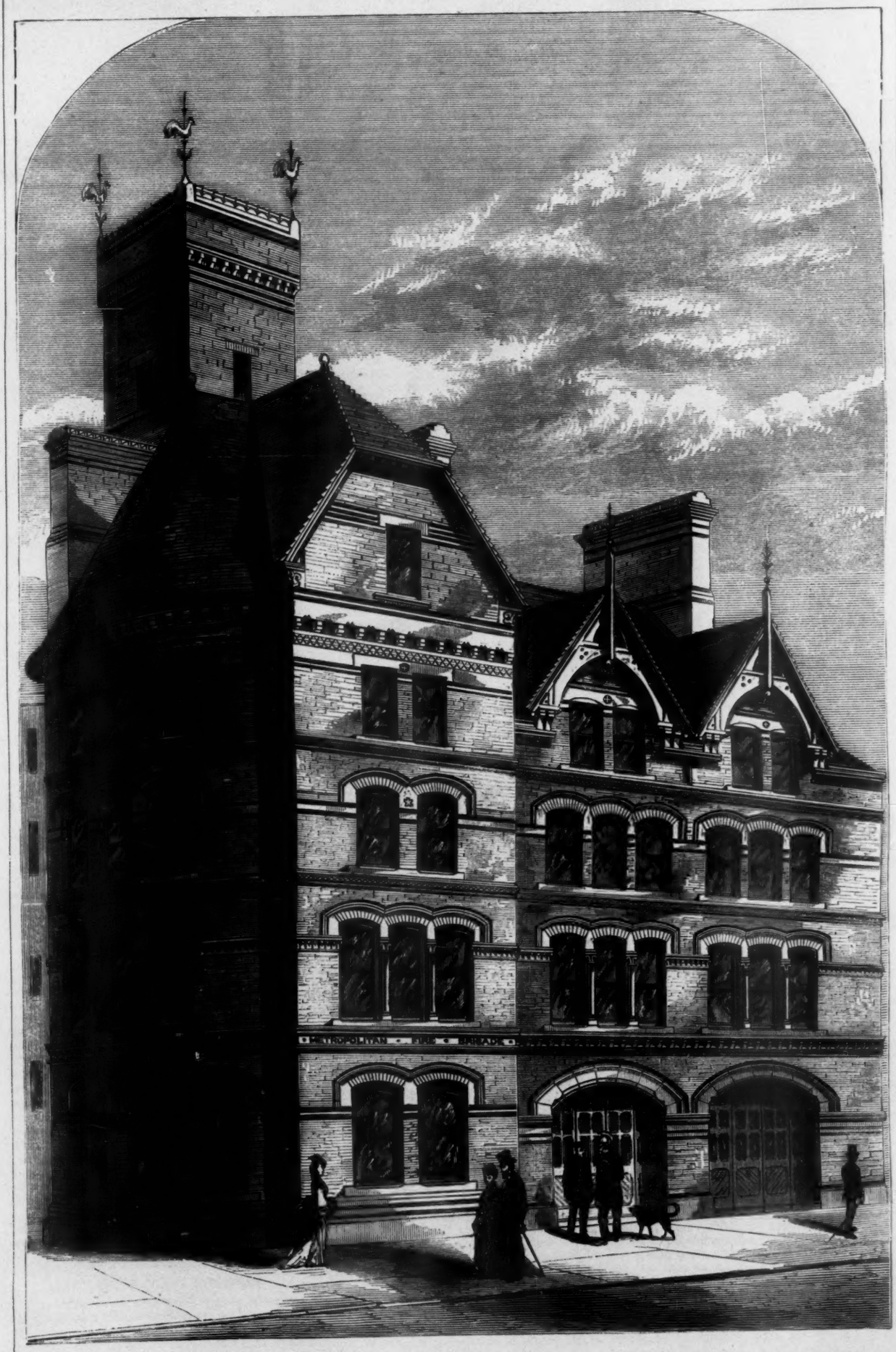
The repose and seclusion of "Old Brompton" were especially well regarded by all those whose lives were passed before the stage lamps.

Pass we on, however, to the lane which led by a wicket-gate into Ramsay's Nursery, celebrated for the careful culture of the yellow rose, before entering which, however, we must look at those quaint old Almshouses in the time alluded to at a much lower level than the ground adjacent, but since completely obscured by their loftier surroundings. So altered is the site that we had some difficulty in identifying it. Nevertheless, there they were, some twelve months since, bringing as it were the past and present in strange proximity.

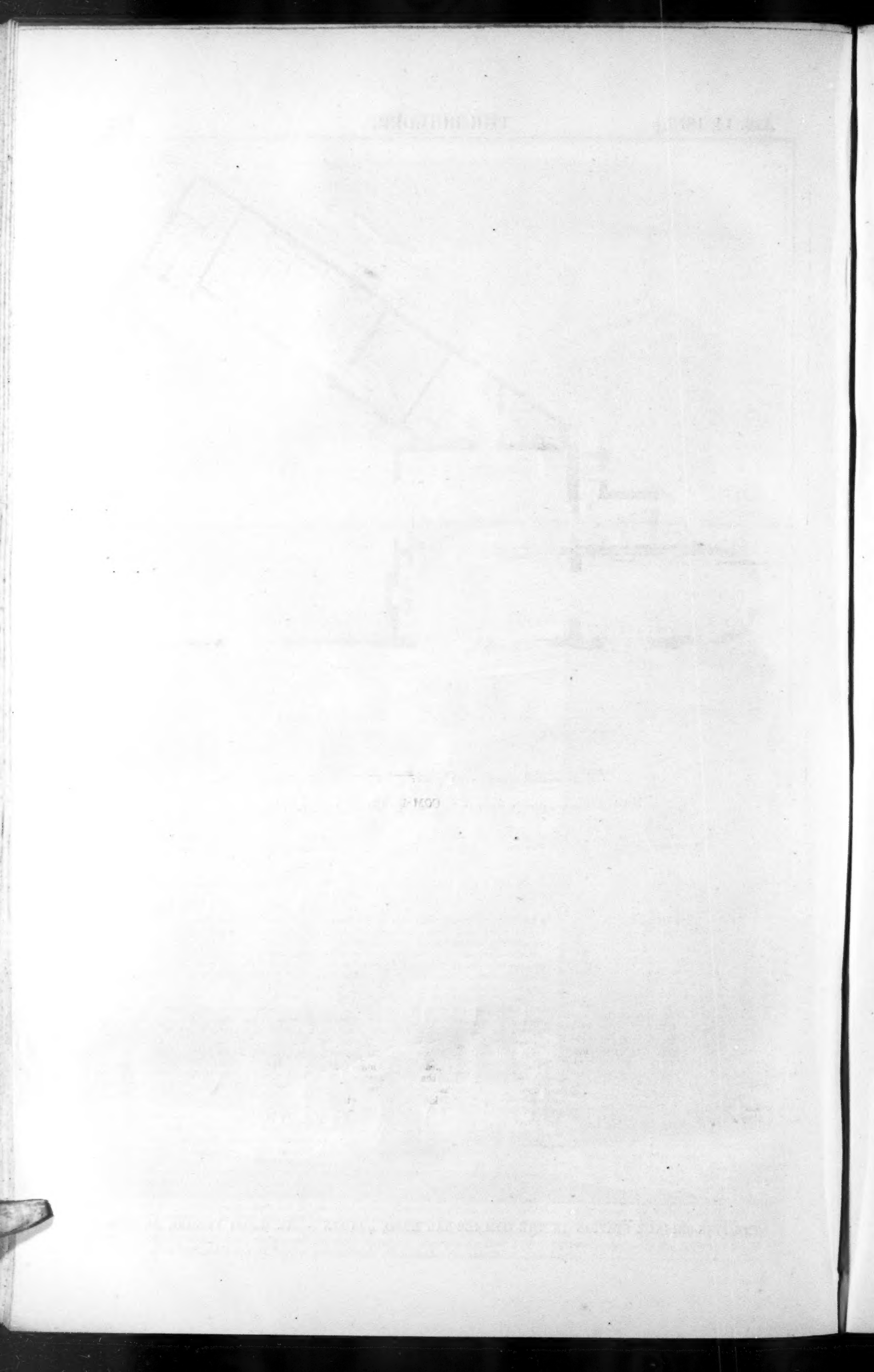
The houses of this charity of William Methwold, esq., bequeathed by will bearing date February 28, 1652, have but very recently disappeared. It was a hospital for six poor women, such to be single, aged fifty years, and of good repute. Sixteen acres of land were settled upon the charity, and each almswoman received 4*l.* per annum. Difficulties occurring in fulfilling the will, the parish filed a bill in Chancery, July 17, 1758, to obtain payment of the pension, and the decree at this date was fully effected. Subsequently the charity was paid by the proprietor of the Hall House Estate.

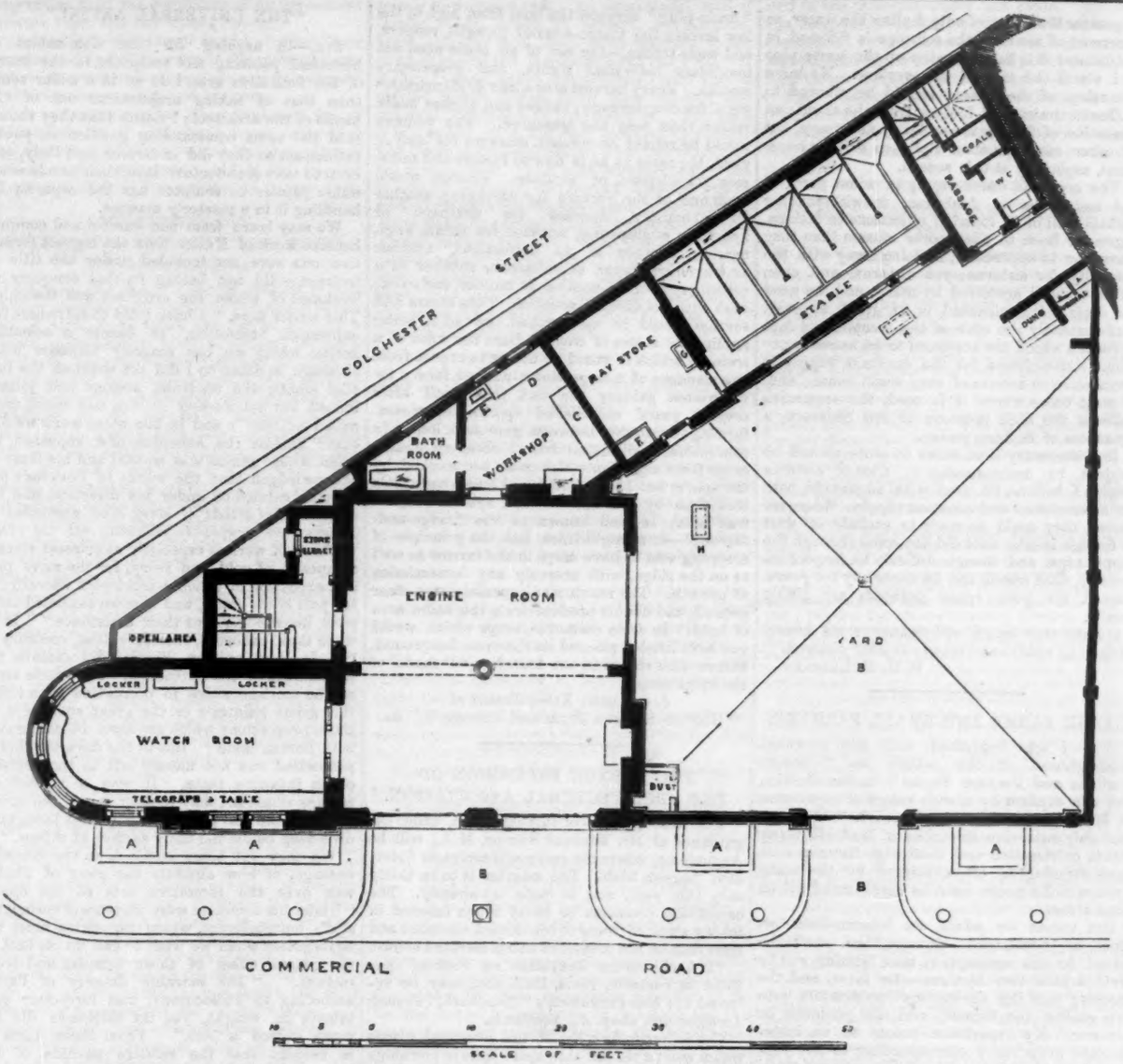
They occupied three sides of a small quadrangular space, and, surrounded as they were with pleasant garden-grounds in the nook of a retired country lane, formed a pretty little rustic bit to look upon.

The homely and picturesque spot has passed away, like many another; the nightingale warbles here no longer; and the sixteen acres of land are, doubtless, now of such a valuation as could never have been conceived, even in the wildest dream of William Methwold. It will not be amiss if one of these days we inquire as to the appropriation of the funds.



THE FIRE-BRIGADE STATION IN THE COMMERCIAL ROAD, LONDON.—Mr. George Vulliamy, Architect.





NEW FIRE-BRIGADE STATION, COMMERCIAL ROAD.—*Plan.*

A. Iron grating.
B. Mount Sorrel paving.
C. Movable table for cleaning hose.
D. Vice-bench.
E. Sink.
F. Cornbin.
G. Cupboard.
H. Inspection pit.

THE NEW FIRE BRIGADE STATION, COMMERCIAL ROAD.

We give a view and plan of the new Brigade Station in the Commercial-road, London, which has been erected for the Metropolitan Board of Works from the designs of their architect, Mr. George Vulliamy. This is the superintendent's station of the C district, from which there is telegraphic communication with the chief station in Watling-street, and with each of the stations in the district. Accommodation is provided at this station for the superintendent, twelve firemen (six married and six single), one coachman, five horses, three fire-engines, and two fire-escapes. The superintendent occupies six rooms on the first floor. The single men have a kitchen and two bedrooms, and the married men have each a kitchen and two or three bedrooms, according to the necessity of their families.

LOOK AFTER YOUR CISTERNS.

Sir,—The value of a good supply of water, thanks to your efforts and those of other sanitary reformers, is much better appreciated than formerly, but the public mind still needs to be impressed with the fact that good store is not the only thing to be desired, obtained, and paid for, all further care concerning it being dismissed. Open cisterns require cleansing more or less frequently, and especially at this season, or else water, that very useful agent of health, may convey disease, as its very usefulness for cleansing depends on its readiness to absorb or combine with other matter. If cleansing was the only purpose for domestic water-storage, the amount of contamination derived through neglect of cleaning out cisterns would be of small account; but there is another use, inferior as to quantity, but all-important with regard to quality, namely, for drinking and culinary purposes. Contamination may take place when there is no visible source of uncleanness (as in the case of a soil-pipe ventilating through the waste-pipe), but generally a need of cleansing will manifest itself to the eye, *i.e.*, *when* the eye is brought to bear upon it; and here is the main cause of the neglect. A cistern in a kitchen, with the top edge about 6 in. from the ceiling is not very easily inspected, but without or even with a cover it is liable to receive dust caused by sweeping, besides being in some measure exposed to a tainted atmosphere; and yet there are few cisterns so placed as more readily to invite attention, though they may be more accessible.

It seems to be studiously contrived that, for good or for evil, cisterns should be placed out of reach or out of sight. Not always for evil. I have seen a cistern placed in a top room devoted to the purpose, kept very clean, and locked up to prevent the entrance of children. But, out of sight too frequently means out of mind, and then it requires to be seen to be appreciated, the amount of uncleanliness that can be tolerated, and the objectionable places chosen for cisterns, in a dark cellar, or under the roof tiles, without cover or partly covered, or outside on the top of some outbuilding, with wooden cover, but exposed to the hot sun, which promotes a green, slimy vegetation in the water, and a fungoid growth on the underside of the cover. These are some of the choice places where water is allowed to rest undisturbed and accumulate dust. It may be harmless coal dust, or it may be house dust, or road dust, charged with animal matter. Perhaps the worst position for a cistern is close to the ceiling of a room, with access by an opening in the floor of the bedroom over, just as large as the joists will admit of; it is a capital trap for blackbeetles, and even rats find a watery grave there, though the fact may not be known for a long while after; and as for dust, a sample may be seen on the thick veil of cobweb which has arrested some of it. But there is another source of evil, viz., unguarded communication with the water-closet. The cistern must supply the closet pan with water, and is too apt in return to be supplied with foul air, and if the waste-pipe discharges into the soil-pipe the evil is enormously increased; trapping the pipe is an untrustworthy remedy. Should the cistern be inside the house the danger from this nuisance

is greater than that of only fouling the water, as a current of air from the soil-pipe is diffused in the house; it is better to stop up the waste-pipe and stand the risk of an overflow. No mere cleansing of the cistern should be allowed to suffice in the case of foul air from the closet; an alteration of fittings is absolutely necessary, but in other cases constant vigilance will be beneficial, especially at this season.

The constant water-supply to some parts of the metropolis is, doubtless, notwithstanding certain well or ill founded objections to fittings, a greater boon to the poorer classes than they know how to appreciate, in doing away with the necessity for cisterns; yet cisterns, and even butts, are still preferred by many, and the need for their being cleansed is as great as ever. Unfortunately the cost of the complicated contrivances which are supposed to be necessary to adapt water-closets for the constant supply is prohibitive to owners of very small houses, and, in most cases where it is used, the apparatus reduces the high pressure to low pressure, a great loss of flushing power.

Is it necessary that water in store should be subject to contamination? Closed cisterns might, I believe, be used with advantage both for intermittent and constant supply. Wherever placed, they could be made to exclude all dust or foreign matter that did not come through the supply-pipe, and though difficult to inspect internally, that would not be necessary for years. Regard for your space prevents my giving details.

I hope this letter will induce some householders to look to and clean out their cisterns.

F. H. McLachlan.

LARGE FARMS AND SMALL FARMERS.

Sir,—I was impressed with the practical thoroughness of the article on "Peasant Gardens and Peasant Farms" in the *Builder*, and can confirm by a wide range of experience in farming, from a rood of land to 800 acres, that only extensive stretches of land will repay steam cultivation, and that high-farming—as stock-farming is often termed by the slang writers of the press,—can be best carried out on large areas.

But unless we admit an intermediate extent of homestead acreage, we shall be forced to the assumption that farming will be divided into two sections—the farm, and the garden; and the agricultural proprietors into two grades, the farmer, and the gardener or labourer. My experience points to an intermediate proprietary corresponding to the yeomen class of olden, and of the present time. Men who will cultivate the land around their homesteads aided by all the improvements of steam-worked machinery, and town sewage; who have a love for their occupation, not simply a vested interest in it; who dignify it by their sturdy toil, instead of being a bailiff of so many acres; men to whom science will lend its light and leverage to exalt the noblest occupations.

> From toil-turn'd muck, to win the food of man,
> And rich ripe plenty wrought by science' aid;
> The world, leave better than when he began
> The tiller's craft, and honest yeoman's trade.

While admitting that for small hedged-in plots the spade, prong, and hoe, are the only implements by which the ground can be worked, I wish to point out that small areas of ground, when undivided by hedge or ditch, may be worked by horse or steam, collectively. As facts are to theories, as substances are to shadows, I will give the result of seven years' experience of facts, carried out to elucidate the value of spade culture for gardens and allotments and small holdings, and the same ground worked by horse-power. I will at once state the result of my experience. That wherever it is possible to use horse-power, spade cultivation is a waste of human life, and wherever steam-worked machinery can be applied, the use of horse-power would be a waste of a nation's wealth; to this I add, that gardens in many cases may be worked by horse-power, and small farms by steam-power. What is a steam-cultivated farm of three thousand acres—owned by one man and managed by one bailiff—but an aggregation of small farms of some former period? Surely the method of cultivation does not necessarily compel divestiture of rights. Science, which is the hand-maiden of toil, dividing and diversifying toil, could find ample work for thirty yeomen proprietors on 3,000 acres. The absence of hedges and ditches on the 3,000 acres, so as to allow the steamer and drum to draw the "drain-plug" through the land from high to the low levels; the steam-worked ploughs, reapers, and tram-trucks,—the use of all these need not invalidate individual rights, and proprietary results. Every harvest sees a new field-measurement for crop acreage; hedges and ditches baulk rather than help the measurer. The yeoman would be reliant on correct measure for land or yield, the same as he is now to factors and salesmen for disposal of produce. Science would train one of the yeomen for surveying, another for chemistry, another for drainage or hydraulic engineering, another for steam engineering, another as an accountant, another as travelling buyer or salesman, another as a veterinary surgeon, another as builder, and so on; each with his distinct vocation. Thus steam and sewage would be well applied, instead of being applied at a loss of capital, from the want of a training which it would be unfair to expect from one manager of a large steam-worked farm; for we cannot gainsay the fact that until after several years' established operations, steam-farming fluctuates between gain and loss. In conclusion, I will detail how I obtained double crops from a garden which was *not* worked by the spade, but by the hough and horse-hoe at less cost than by the spade. The system adopted was what is well known as the "ridge-and-furrow,"—in straight lines, but the principle of cropping was to have crops in the furrow as well as on the ridge, with scarcely any intermission of growth. The result was superior crops, clear ground, and double produce from the same area of land. In some instances, crops which would not have lived if planted on the open flat ground, throve with vigour in the trench, and shade of the ridge crops.

J. Charles King, Author of
"How to Select a Farm and Manage it," &c.

THE FRENCH EXCURSION OF THE ARCHITECTURAL ASSOCIATION.

The head quarters of this excursion, under the guidance of Mr. Edmund Sharpe, M.A., will be Angoulême, where the party will arrive on Saturday, August 28th. The number is to be thirty only this year, and is made up already. The expedition promises to be of much interest in taking stock of some of the domed churches and their details, not measured and illustrated before.

"L'Architecture Byzantine en France," par Felix de Verneilh, Paris, 1851, 4to., may be referred to; also Fergusson's "Handbook," French Architecture, chap. ii., Aquitania.

The following is a list of the principal places which will be visited. Any spare time in mornings and evenings will be devoted to Angoulême Cathedral, &c.:—

Monday, Aug. 30th.—Fleac, Linars, Trois Palis, Nersac, and St. Michel.

31st.—La Couronne, La Palud, Roulet, St. Estephe, and Mouthiers.

Sept. 1st. — Moutiers, Plassac, Mainfonds, Champagne, and Blanzac.

2nd.—Puyperoux, Montmoreau, and Chalais. (Sleep at Chalais.)

3rd.—St. Quentin and Aubeterre.

4th.—Passirac, Chillac, Berneuil, Coudeon, and Barbezieux. (Return to Angoulême.)

Sunday, 5th.—At Angoulême.

6th.—Chateauneuf, St. Simon, and Bassac.

7th.—Bourg Charrente, Gensac, and Cognac. (Sleep at Cognac.)

8th. — Cherves, and Châtres (Cistercian Abbey). (Return to Angoulême.)

9th.—Plaizac, Rouillac, Gourville, and Lanville.

10th.—Ventouse, Cellefrouin, and Larochefoucauld.

Saturday, Sept. 11th.—St. Amand de Boixe, and back to Angoulême, where the final dinner of the excursion will take place at six o'clock.

Sinking an Artesian Well at Warrington.—Mr. Chapman, engineer, Salford, has just completed the sinking of an artesian well, for the brewery firm of Messrs. Walker & Sons, Warrington. The work of sinking the shaft was commenced on June 21st. It has been carried to a depth of 33 ft. and its diameter is 6 ft. A 12-in. bore-hole has been drilled to a further depth of 30 ft., and the level of the water stands at 32 ft. The supply is obtained from the new red sandstone. It is abundant in quantity, bright and pure, and free from surface impurity. About 200 gallons per minute are at present being pumped.

"THE UNIVERSAL ARTIST."

Sir,—In arguing for the domination of historical painting and sculpture in the realm of the formative arts, I do so in a wider sense than that of taking architecture out of the hands of the architect: I desire that they should hold the same commanding position in public estimation as they did in Greece and Italy, and even to take architecture into their hands when either painter or sculptor has the capacity for handling it in a masterly manner.

We may learn from the careful and comprehensive work of Müller that the highest formative arts were not included under the title of *tectones*,—did not belong to that company of workmen of whom the architect was the chief. This writer says, "I have tried to introduce the expression 'tectonics,' to denote a scientific notion which we can scarcely dispense with, although in doing so I did not overlook the fact that among the ancients, masons and joiners indeed, *but not workers in clay and metal*, were called *tectones*"; and in the same work we find that "Phidias the Athenian now appeared, an artist whose genius was so vast and his fame so acknowledged that the works of Pericles's age were all carried on under his direction, and *the entire host of artists of every kind assembled at Athens were occupied in following out his ideas.* He himself worked especially at colossal statues composed of gold and ivory, for the more perfect execution of which, *unexampled liberality on the part of the state*, and a more extended technical knowledge, lent their assistance." It is more than probable, therefore, that, contrary to "T. L. D.'s" opinion, Phidias did dictate the proportions of the Parthenon. For whose sense can be more sensitive to proportion than either the great painter's or the great sculptor's, to those proportions which are most in conformity with human taste? But in the days of Phidias proportion was not merely left to the decision of an intuitive taste. It was a science,—a science which art may recover when the nation can get time and patience to permit thought to dive deep below the filmy surface of things.

We may get some notion from the following passage, of how absolute the sway of Phidias was over the formative arts of his epoch. "Under his direction were weavers of variegated stuffs, embroiderers, whose tapestries must not be forgotten when we wish to call up an idea of the general effect of those temples and ivory statues." "The movable drapery of Pallas, according to Philocorous, was forty-four gold talents in weight, yet its thickness did not much exceed a line." From these facts it is evident that the relative position of the great artists of the human figure to workers in other branches of the formative arts was precisely the same both in the epochs of Phidias and Raffaelle. I arrived at the conclusion that this state of things must exist, when art attains to its greatest perfection, from studying the genesis of ideas and the natural order of interdependence in the arts, and from the evidence of the cinquecento, before I lighted upon the important facts which have been recorded of the age of Pericles, and quoted above. And it must be clear that the Greeks put the same value on their own saying of "Let every cobbler stick to his last," as I did in my letter of the 31st ult. It was intended as a caution to those beings of very limited powers, who were incapable of any effort beyond bungling and patchwork.

W. C. T.

BEWICK AND NEWCASTLE.

Now that the British Museum will be the custodian of the brothers Bewick's splendid art collection, considerable rivalry for possession of the cuts and original drawings has come to the front; and the Natural History Society of Newcastle-on-Tyne has almost claimed them. The University of Cambridge is also anxious to become their possessor, and if it had been a question of money an almost fabulous price could be obtained for them.

It is too true, however, that the town and district that Bewick's services to art have made famous, have never appreciated their townsman's merits, and the family of Thomas Bewick have not had much reason to bequeath this art collection to Newcastle-on-Tyne.

The workshop in St. Nicholas Churchyard, in which he laboured so usefully, was legally wrested from his children; and it is only necessary to take a stroll up West-street, Gateshead, at the present time to find an example of how the

corporation fulfil the conditions of an agreement between them and the Misses Bewick.

Thomas Bewick himself would, if alive, have unquestionably felt prouder of the present capabilities of wood-engraving than any monuments of stone or brass erected to his name.

It is not surprising to learn that very few of the inhabitants of Gateshead were aware that they had for neighbours two of the daughters of Bewick, until it was announced in the London papers, and now all are anxious to "leave their cards." L.

CAUTION TO BUILDERS AND THEIR HORSEKEEPERS.

The rapid rise in the value of draught horses used by builders and trades in connexion therewith is such as to make the loss of a horse a serious item against building profits, in many instances, draught-horses fetching at fairs as high figures as 100 guineas each, a price actually paid for the cattle belonging to the rollers and mud-carts of St. George's, Hanover-square. These giant horses, moreover, consume extra corn, hay, and chaff, and it so happens that *pari passu* has arisen the cost of provender. The present hay season is admitted to be a failure, few farmers stacking sufficient hay for their own use. To show the heavy cost of keeping horses, no better gauge can be had than the fact of hundreds of light horses now being in the market for sale at any price. The great London carriers and the London General Omnibus Company estimate this year's increase in the price of horse-provender, not by hundreds, but by thousands, of pounds.

To alleviate this state of things, our great corn, hay, and straw dealers have turned their attention to a foreign supply, and compressed hay has been imported from Hamburg to a large extent. It is to this provender the attention of builders, horsekeepers, and veterinary surgeons is particularly directed.

Near to the town of Barnsley, in Yorkshire, a large number of horses are kept for colliery purposes, and for several days last week all operations were stopped, and 500 men and boys thrown out of work at one colliery, in consequence of illness and deaths among the horses. On one day eight horses died, valued at 400*l*. On inquiry, it appears that seventy horses in one pit were healthy and in good work, when foreign hay was given them to eat. After partaking of the stuff for a few days, the whole seventy fell off in their food, and refused to eat the hay, and a few days afterwards a number of the draught-horses and ponies were attacked with influenza, followed by bronchitis, and pneumonia, after which typhoid fever of a very malignant character set in. The result was that several died and numbers are under veterinary treatment.

The veterinary surgeons have made a *post mortem* examination of the animals, and are all of opinion that the disease, in the first instance, was caused by the foreign hay eaten, and this view is supported by the fact that the hay in question was brought into the port of Hull, where recently a number of horses have died through eating the same Hamburg shipments.

Those who contract with hay-dealers should see that this foreign hay is not supplied.

NEW CONGREGATIONAL CHURCH, WELLINGBOROUGH.

This building, which is being erected from the designs of Mr. Edward Sharman, architect, at a cost of close on 9,000*l*., is making rapid progress. The principal frontage faces towards High-street, and the site is well elevated above the road. In its plan the shape of the church is an ovel, with north, south, and west projecting porches, over which are ways of access to the gallery and chancel, or apse-like recess at the east end, divided from the church by a lofty and well-moulded arch, in which the organ will stand. Thus it will be at once seen that the form of a Maltese cross will as nearly as possible describe the shape of the ground plan. The style of architecture adopted is Early English somewhat freely treated. The stone used in the construction of the building is of a warm yellow tint, and is of local extraction. It is known in the county as Duston stone. The dressings are Bath stone, from the Farley Down quarries. The columns to the window mullions are in each instance of red Mansfield stone. The entrance-gates and the gates to the main doorway are reached by a flight of some dozen steps. The doors are of deal framing filled in with V-jointed panels of wainscot oak. An ornamental wall of Duston stone, coped by worked and moulded brick, together with Bath stone capitals to the piers, separate the buildings from the road. A gallery, which takes the undulated wall line, is carried round rather more than one-half the building, supported by iron columns. The roof is not open. It is flat and panelled in plaster. The organ is recessed behind what one may term the chancel arch. This arch is supported by red Mansfield columns, and carved capitals, representing respectively wheat and grapes, and the lily. There is also a carved running ornament—ivy—up the soffit of the arch. The pulpit will be a feature; as yet it is not fixed. The seats are all open benches. Mr. John Beddington, of that town, is the contractor for the works. The carving has been executed by Mr. Harry Hems. Mr. Paine is the clerk of the works.

BAD MATERIALS UNDER METROPOLITAN BUILDING ACT.

Mr. Thomas Eyres was summoned by Mr. Knightley, district surveyor of Hammersmith, with respect to the quality of the mortar used in the construction of houses in Gratton-road. Two samples of the mortar taken from the buildings were produced, it being stated that it contained 20 per cent. of sand and 80 per cent. of loam. The defendant had been cautioned for using mould.

The defendant said they were not fair samples.

Mr. Knightley explained that the lower part of the wall was built with that mortar, but better mortar was used for the upper portion.

The defendant said he used lime, sand, and refuse of a brickfield in equal proportions to make the mortar hard.

Mr. Ingham left the Bench to inspect the work, and on his return made an order for the wall to be pulled down in seven days.

The defendant said he should take the case to another Court.

Mr. Ingham said he had done with the case.

SALARIES OF MUNICIPAL SURVEYORS AND ENGINEERS.

Sir,—As a constant reader of the *Builder*, I have seen with much satisfaction accounts of the proceedings of that newly-formed Association of Engineers and Surveyors to Municipal Authorities, but not being sufficiently acquainted with the object of their intentions, whether it be for the mutual interchange of opinions for the general good of sanitary science, or for the advancement of their own individual interests, or both, I do not know; but I have for some time taken a great interest in works connected with town improvements, and as the officers who design and superintend such improvements are necessarily engineers, I have often been and am surprised at the small proportion their salaries bear to the important and varied works they carry out.

Indeed, it is beyond the power of some of them to make provision for the time when age incapacitates them from performing their duty; and, looking upon the matter in a purely disinterested light, I would venture to suggest to this Association the advisability of taking steps with a view to obtain superannuation. I see a Bill is being passed in the present session to superannuate county surveyors in Ireland, and as the amount of their salaries favourably compares with those of borough surveyors, I fail to see the justice of providing for one and neglecting the other. Moreover, the duties to be performed by the surveyor to a corporation would be greatly improved, and the work more satisfactorily executed, were the said officers placed beyond the entire control of local influence. L. L.

CLAY A MINERAL.

A suit has lately been heard before Vice-Chancellor Hall (Linskill *v.* Charlton) which is interesting in its result, as it affects the brick trade.

The plaintiff, Capt. W. Linskill, Lord of the Manors of Great and Little Moorsom, in the parish of Skelton, in Cleveland, filed his bill for an injunction against the defendant, William Charlton, the owner of an encroachment of four acres, part of the Moorsom Moor, called the Low Moor, whose father (being then owner) had on the occasion of the Moorsom Inclosure signed (with other encroachers) an agreement to hold the encroachments subject to the right of the lord to the minerals under the same. His son, the defendant Charlton, acting (as the plaintiff contended) in contravention of such agreement, was proceeding to dig for and get clay, and to turn his encroachment into a brickfield.

The Vice-Chancellor made a decree in the plaintiff's favour, granting the injunction, thus deciding (in accordance with other decided cases) that clay is a mineral in the ordinary sense of the term.

GENERAL FOREMEN AND CLERKS OF WORKS.

BRICKLAYER *v.* CARPENTER.

Sir,—I have long been impressed with this fact, that whenever your advertising columns are used to invite candidates for the position of clerk of works, or general foreman, it is almost certain to be especially stated,—"A Carpenter and Joiner preferred."

Now, Sir, in past years, when in building construction timber framing, &c., was more the rule than the exception, and wood generally was used in greater quantities than modern architects deem essential, and the log timber was sawn and converted into its several uses, and the joiners' works prepared on the works, I admit the above position may have been well filled by a carpenter. But time has changed that order of things, and I contend that the above stipulation is neither justifiable nor necessary to obtain the fittest man.

Having been engaged as foreman in my own branch, general foreman, and clerk of works on important public and private works for twenty-five years, I can speak with some authority.

When I ask, why is the carpenter preferred, I am told they are the most respectable. No doubt, owing to the nature of their work being more clean than the other branches, they can appear more respectable, as far as dress goes. I am told they are the most educated; and, no doubt, time has been when there was some truth in that; but that they are now is open to question. It is said theirs is the leading branch. This I most emphatically deny. That a man can be perfect only in one trade is a well-known fact. The question is, "Which trade should be the most fit to hold the leading position, and to be entrusted with the superintendence of the whole?"

To be a competent joiner a man must pass all his early life in the shop, with perhaps an occasional turn in the building-fixing, when, mark, the superstructure is completed. When a joiner obtains his first appointment and emerges from the back of the bench, he must of necessity lack the practical knowledge of the most vital points in modern construction.

Is the joiners' shop the place to get experience in earthworks, concrete, brickwork, masonry, &c., the nature and behaviour of limes and cements,—in fact, any of the multifarious duties, the knowledge of which constitutes a genuine clerk of works or general foreman? It is all very well for a man to pick up a little smattering of technical terms from the leading workmen in the different branches, that he may be better able to answer questions when interrogated upon any particular point; but, is that sufficient?

Again, foundations, brickwork, masonry, form the largest financial items, and should be in the hands of a man that can adopt the most ready and complete systems to insure success and economy, instead of delegating it,—as a carpenter must necessarily do,—to a deputy, at, perhaps, a 1d. per hour extra pay, who does not always feel an interest in the job. Why should he, seeing the other is to have the credit? Whether the work is good or bad, or comes out to pay or not, it is all the same to him. With very rare exceptions the joiners' work and framing, roofs in particular, are prepared at the builder's yard, which is frequently miles away, and are brought to the building ready to fix, so that the carpenter's work is the smallest item of labour done on the spot.

Surely a bricklayer, who serves the whole of his time on the building, and who, especially if he has been reared in the country, has to work his way through all the grades, even to making his own scaffolds and helping to make his own mortar, should be the man best able in after years to direct and instruct others, and to judge of a workman's ability to earn his wages without seeking advice from others. I say the bricklayer, if he would only grasp the opportunities he has at command to acquire the necessary practical knowledge of the other branches immediately in connexion with his own, should be the fittest man. And I make an earnest appeal to bricklayers to awaken themselves to the importance of these remarks, and see their true position and fit themselves to occupy it. To encourage them, they have only to look around and see its consummation in instances not a few, but if they were more general, the eye would not so frequently be offended by those frightful abortions that bear the name of brickwork.

The least they can do is to shake off the load of prejudice with which they are handicapped, in the race with the *carpenter*, for the leading position. The motto should be—"Let the best man win." A Bricklayer.

ALLEGED SYSTEM OF DEFRAUDING MASTERS.

On the 5th inst., at the Westminster Police-court, before Mr. Arnold, Edward Cummings appeared in answer to a summons charging him with obtaining the sum of 8s. 6d. by false pretences from Mr. J. P. Seagrave, proprietor of the Westminster Zincworks, 46, Rochester-row, Westminster.

Mr. W. D. Smyth, who prosecuted, stated that the case was an important one to masters who possessed a country business like the complainant, and the system pursued by the defendant was one by which masters were often defrauded. The defendant was employed by Mr. Seagreave, and on this occasion was sent to work at a public-house at Somers-town. The fraud complained of occurred on Friday, the 23rd of July, when the defendant by his time-sheet represented he had worked nine hours, whereas he had not worked at all, and had not gone to the job until late in the evening.

Proof having been given,

The defendant said that, although he was not at work, he was engaged on his master's business.

Mr. Arnold adjourned the case, ordering the defendant to find one surety in 5*l*. for his appearance.

MEDICAL AND ARCHITECTURAL SANITATION.

Sir,—There is an important sanitary suggestion just now brought under medical notice in Edinburgh that may be interesting to your readers as a hint in W.C. ventilation. Here so many of these closets being lighted and ventilated into the common staircase, that gives access to the different dwellings in flats, each W.C. requires gas light, which, when enclosed by glass in a veniduct or flue pipe, the mouth of which, opening at the seat, naturally carries away at once all vitiated air to the chimney where the flue terminates. Thus by the suction of a heated flue opening under the seat, not only are sewage emanations prevented from escaping into dwellings, but no person using this closet is immersed in vitiated air, and the household supply of water placed in W.C. cistern, so generally overhead, is no longer surrounded with a polluted atmosphere. The supply of fresh air entering near the ceiling, there need be no extracting foul-air flue but that opening under the seat of the closet, which may be made to act as powerfully as an Arnot stove, drawing even the fumes and smoke of tobacco into it. There is no great architectural difficulty in the introduction of such W.C. ventilation here any more than in the American cities, where it is adopted with success. J. K.

CREMATION.

Sir,—Professor Bernays, in a letter to the editor of the *Times* headed "Humation and Cremation," appears to think that cremation can never become the popular mode of disposing of the dead because it is opposed to a religious sentiment. Cremation is doubtless opposed by a prejudice, but by no means by a true interpretation of the injunction of "earth to earth."

This prejudice, however, would soon be overcome if the matter at issue were to be placed before the public in its broadest aspect. If the public were to be shown that in whatever way the body be disposed of after death it must be consumed, *i.e.*, in some sort be actually cremated; for nature resolves everything by combustion. Every human being, even during his existence, is over and over again consumed or cremated,—it used to be said once in seven years, it is now affirmed in a much shorter period of time. The only difference, therefore, between committing the body to the flames and burying it, is the difference between a quicker and a slower process of combustion.

Has education, scientific education, failed to help us to no broader interpretation of "earth to earth" than that of Mr. Seymour Haden? It would seem that it has not. The narrowness of that interpretation would convict thousands and tens of thousands of persons of having broken the letter of the law in consigning the remains of their relatives to graves of gravel, clay, and what not instead of to "earth." And in so doing, if Mr. Haden's interpretation were the correct one, they must have sinned against religion. And all who have consigned the remains of their relatives to vaults, catacombs, rock-cut tombs or lead, from the time of the patriarchs to the present day,—nay, even the disciples of our Lord themselves,—would stand condemned.

What, then, in their broadest sense, do the words "earth to earth" really mean? Why, nothing more than this, that all matters within, upon, and to the limits of the atmosphere of this planet is of the earth; and of the earth, earthy. That all living beings are composed of its elements, and must again be re-solved into them. Therefore, in whatever way we may dispose of the human tenement after the spirit has departed, we shall fulfil the sacred injunction of committing "earth to earth."

Mr. Seymour Haden's system would, if it were to be carried out to any great extent, be more noxious than the present one. The earth would become surcharged with animal matter, and infect the neighbourhoods, and beyond the neighbourhoods, of the cemeteries; for the earth,—even Mr. Haden's "earth,"— does not enter into chemical combination with the resolving elements, but for the most part holds them suspended till they can be re-appropriated by either vegetable or animal life.

Coffins of wood and lead to a certain extent prevent the earth from becoming surcharged with decomposing human remains. These receptacles part very slowly with their contents, and thus to some extent preserve the living from the evils of a free, but slow, combustion, under the surface of the earth.

The greatest evil of our present system of burial is this, that it withholds for too long a period those elements which are necessary for building up the tenements of a new generation, prevents them being quickly re-appropriated by the living. This is doubtless one source of disease and degeneration. The materials for 7,000,000 human beings are at this very moment thus withheld from circulation and re-appropriation in Great Britain. Cremation is, *par excellence*, the quickest mode of returning "earth to earth," for disseminating the material elements of the dead human body, so that they may be the most readily re-appropriated and utilised by the living. Moreover, to show in how general a sense the sacred injunction of "earth to earth," is to be taken, we have, as synonymous expressions, "ashes to ashes," "dust to dust," "clay," &c. It should neither be forgotten that nature has not implanted any instinct to bury, that for eons of time all animal life died and rapidly decomposed upon the surface of the earth. Seeing, then, that whatever mode of disposing of the dead be adopted, it must inevitably fulfil the injunction of "earth to earth," we have, as rational beings, to decide which mode will be the best for the common weal of humanity.

Cremationist.

TAYLOR'S AND TOBIN'S VENTILATORS.

Sir,—Upwards of twenty years ago, under the direction of the late Mr. George Taylor, schoolmaster, Leberton, Edinburghshire, I fitted up in the parish schoolroom there a number of upright flues or shafts rising 4 ft. from the floor-level, with openings 9 in. by 5 in., communicating with the external air, so that on entering the school the fresh air was thrown upwards, overhead of the pupils, without perceptible draught, rendering a sweet and pure atmosphere at all times possible without opening doors or windows.

The following description of what is called Mr. Tobin's inventions seems to me exactly an adaptation of Mr. Taylor's idea,—"Communicating with the open air, through a cellar-grating, vertical shafts 5 in. in diameter rise about 4 ft. above the floor, with open mouths, from which ascends to the ceiling an unbroken current of this outer air, like a fountain-jet, so that the interior air is kept as fresh and sweet as the external atmosphere around the building." I cannot say where my deceased friend Mr. Taylor got the idea, but I am certain that the merit of the invention is as much due to him as to Mr. Tobin.

Having long urged this plan of ventilation, I am glad to see its merits now disclosed *pro bono publico*.

James Kerr.

SCHOOL BOARD SCHOOLS.

High Wycombe.—The new Board Schools have been opened, and are designed to accommodate 1,000 children. Plans were prepared, and a contract entered into, for the erection of a block of buildings to accommodate 600 children for the borough only, with a master's house attached. But, a few months later, when the brickwork was reaching the ground-floor, the parish School Board decided to furnish a contingent of nearly 400 more children. The plans had to be enlarged accordingly, and an extended contract was entered into. The first contract amounted to 4,264*l.* 10*s.*; the second to 2,610*l.* 11*s.* 8*d.*; making the total cost of building alone 6,875*l.* 1*s.* 8*d.* From the rapid descent of the ground, the front elevation has a height of 60 ft. or more, with a range of six huge flying buttresses from the main building, the lower openings forming entrances to the covered playground underneath the front of the main schoolroom. This basement is some 70 ft. by 20 ft. in size, and will be a playground in wet weather. The buildings, being shaped like the letter L, have a frontage to the railway, and one also to the Cemetery-road, giving a total length on the two sides of some 250 ft. The style of the buildings is Early Gothic. The main staircases are of stone, and the material of the building is red brick, with slated roofs. All the windows have stone dressings, into which cast-iron casements are fitted. The whole of the fittings are of pitch-pine, varnished. The interior walls are painted to the height of about 4 ft. with the Imperishable Paint Company's paint of a purple-brown tint, finished with a black line, and the walls are coloured above. Between the floors, "sound pugging" is introduced, to prevent the voices in one room from interfering with school operations in the other. The contractor has been Mr. William R. Loosley. The architect was Mr. Arthur Vernon, of Wycombe.

Brynhyfryd.—On the 2nd inst., Brynhyfryd Board Schools were formally opened. A schoolroom was formerly erected at Brynhyfryd, and school work was for several years carried on there by a body of denominational subscribers; but some time ago the Swansea School Board took the schools into their own hands, and set about adapting them and further extending them to supply the accommodation required. The school-house then already built was capable of accommodating 264 boys, and the Board have since erected on the roadside, opposite the older buildings, a new girls' school, to accommodate 234 scholars, and an infant schoolroom, affording space for 220 infants. To these have been added a number of class-rooms, and residences for the masters and mistresses. Mr. George Harmain, the surveyor to the Board, is the architect, and Mr. White is the builder. The entire cost is something like 2,000*l.*

SCHOOL BUILDING NEWS.

Halifax.—The congregation of the Methodist New Connexion chapel, at King-cross, have had the memorial stones of a new school laid, which for a time will be used as a place of worship as well as a school. The school is designed in the Gothic style of architecture, the central window and gablet, with the fleche on the roof, being the salient feature in the design. On the sub-ground floor will be located the infants' class-room, and caretaker's house, with the heating cellars underneath. The ground-floor will comprise nine class-rooms, with appurtenances. The assembly-room will be over the class-rooms, and about 21 yards by 15 yards, and will accommodate 500 persons sitting, exclusive of the north and south galleries; the latter of which will contain the organ, the choir, and the scholars, the north gallery being pewed for regular members of the congregation. Underneath the south gallery will be placed the cooking kitchen, superintendent's room, and library. The rooms throughout will be fitted up with boarded dados, and the large room will have an open timbered roof, the ceiling of which will be boarded and stained. The architects are Messrs. Leeming & Leeming, of Halifax; the contractors are Messrs. Culpan & Sons, masons; Messrs. Dyson & Son, joiners; Messrs. Ackroyd & Mills, plumbers and glaziers; Mr. Ambler, plasterer and slater; and Messrs. Thornton, of Huddersfield, heating apparatus. The contemplated outlay is about 2,750*l.*, which includes land for a new chapel.

Kettering.—On Sunday, the 1st inst., special services were held in the Wesleyan Chapel, Silver-street, in connexion with the opening of the "Tordoff Memorial Schools." The new schools are situate in School-lane, being strongly built with red bricks and white freestone, at a cost of nearly 1,500*l.*, given by the gentleman whose name they bear, who also presented the ground on which the buildings stand. On the ground-floor, reached by a flight of four steps, there are six class-rooms, arranged three on each side of the central passage, leading from the front entrance to the infant school-room, which occupies the back part of the floor, and is fitted with gallery and other conveniences. On the second floor is a commodious room, 60 ft. by 30 ft., which is reached by means of two flights of stairs, one on each side of the entrance. This room is furnished with patent reversible desks, capable of being altered to serve the purpose of tables or high-backed seats, as occasion may require; and the whole building is to be heated by means of hot-water apparatus.

A Rotten Bressumer.—A few days since some workmen engaged in repainting Bouverie House, Rendezvous-street, Folkestone, noticed the "bressumer" supporting the façade of the building exhibited symptoms of decay. The services of Messrs Brooks & Slade were called in, and on examination it was found that the beam was seriously affected by dry rot. The upper part of the building was secured, and the replacement of the bressumer has been nearly completed. Had the rotten timber passed unnoticed for a few months longer a serious catastrophe might have occurred.

VILLAGE HOME FOR GIRLS, NEAR ILFORD.

Sir,—On my return to town a few days since my attention was called to a notice in your issue of the 17th ult. of the new Village Home for Girls which is now in course of erection at Barking-side, near Ilford, under my direction, as architect to the East End Juvenile Mission. The buildings are so well described by your notice that I will not trespass on your space by any recapitulation: I would, however, supplement your notice by informing your readers that the buildings include an infirmary, schools, and steam laundry, that the cottages are built of hollow walls in hydraulic lime throughout to insure dryness, that a deep well is being sunk, and that a complete system of pipe drainage will be laid down with filtered outfall. If any of your readers are interested in the work, I may add that the site is not difficult of access.

Ebenezer Gregg.

NEWBURY PUBLIC OFFICES COMPETITION.

This competition was decided in June last, the successful competitor being Mr. Money, a local man. I shall, therefore, be glad to know when the Newbury Corporation propose returning the plans, &c., sent in competition, and what reason they have in retaining possession of them so long?

I have heard that the motto attached to the drawings of the successful man (Mr. Money) was "£. s. d." Perhaps you, Sir, will know if this is correct?

A Competitor.

EUSTON SQUARE.

Sir,—I beg leave to call the attention of those more immediately concerned to the disgraceful condition of the south side of Euston-square, which has been for nearly twelve months converted into a rubbish-shoot, whereby many valuable trees have been utterly destroyed. Until the last few weeks two or more notice-boards were prominently exhibited, informing the public that a Mr. Martin was contractor for the Euston-square improvements; as they have been removed it leaves the public to conclude that the improvement, otherwise the work of desolation, is complete.

George Bartlett.

PURBECK MARBLE.

Sir,—As I have a large quantity of Purbeck marble fixed that will be exposed next winter to the weather, I should feel obliged if you would allow me, through the medium of the *Builder*, to ask what are the best means I can adopt to preserve the polish on the marble?

Casing with boards, or wrapping up with straw, is not sufficient protection.

Purbeck.

BUILDING SOCIETIES.

Sir,—Can I learn through your columns whether there are any building societies which erect houses for persons undertaking to lease them for a term of years when finished? A friend of mine wishes a house erected for him at Knaphill, near Woking, which he would take on lease for fourteen years.

W. G. Lowes.

APPRENTICES.

Sir,—Being an apprentice to a builder, there is one question I should like some of your kind readers to solve: it is, How many hours per week am I bound to work; the men at the shop receiving 9d. per hour, and still working 56½ hours?

An Overworked Apprentice.

STAINED GLASS.

Elloughton.—The west window in St. Mary's Church has been filled with stained glass, the gift of Mr. John Hall. It contains figures of SS. Peter and Andrew, together with a small subject from the life of each. It is from the studio of Messrs. Powell Brothers, of Leeds.

Bradford.—An aisle window in St. John's Church, Horton-lane, has been filled with stained glass to the memory of the late vicar. It is one of a series of windows to illustrate the life of Christ. Messrs. Powell Brothers, of Leeds, have done the work.

Shepherd's Bush.—The east window of St. Luke's Church is now filled with stained glass, the work of Messrs. Powell Brothers, of Leeds. The following subjects have been chosen:—Entry into Jerusalem; Last Supper; The Agony; Before Pilate; Crucifixion; Mary meeting Christ after the Resurrection; and, in the large tracery light, the Descent of the Holy Ghost. The subjects are relieved by ruby backgrounds. The ornamental portions are white.

Birmingham.—A memorial window, consisting of two lights, has just been erected in St. Mark's Church, King Edward's-road, by Mr. F. H. Griffiths, in memory of his late parents. The subjects respectively are "The Crucifixion," and "The Descent from the Cross," depicted under architectural canopies. Above the canopies are painted quarries, to form a background, the lights being of considerable length for one subject. In the centre of the painted quarries are treated a monogram in a medallion. The base of the window has in each compartment an angel holding a scroll. The work was executed by Mr. Swaine Bourne, who has also the commission for six stained-glass windows, for Drayton Bassett Church, for Sir Robert Peel, bart.

Books Received.

Practical Guide to Carlisle, Gilsland, Roman Wall, and the Neighbourhood. By Henry Irwin Jenkinson, &c., &c. London: Edward Stanford.

The author hopes that this handbook, accompanied as it is by a map, will enable a visitor to "merry Carlisle" and the adjoining district, to visit the many places of interest in the neighbourhood "without asking a single question, and to feel as though he had obtained the companionship of a friend thoroughly conversant with the neighbourhood." The book appears to be very completely done, and likely to bear out this promise, in the hands of travellers of ordinary intelligence and observation. It is divided into three sections, under the three heads given in the title. The author is a better guide in topography than in æsthetics, however, if we may judge from his quotation of Bulwer's "fustian" (it deserves no other name) about John Martin, on describing Haydon Bridge, where that painter was born. The third section of the book follows the Roman wall in a walk from coast to coast,—a good idea. The author recommends the walk to be taken from west to east, as the traveller then moves from the less to the greater, and his interest increases. Of course, Dr. Bruce's book remains the highest and completest work on the Roman wall remains; but the handbook of Mr. Jenkinson brings a great deal of information into a small and portable compass, and draws largely on Dr. Bruce and other archæological authorities. He contests a point with the former, indeed, in regard to what is generally regarded as the "vallum," and which he considers as being, though made at the same time as the fortification, not literally a part of it, but simply the road which for military purposes would have been necessary along the lines. He gives one or two statements of facts in support of this view, which would appear to have come to light since Dr. Bruce's investigations; for instance, that the Vicar of Gilsland had discovered on the site of the vallum the pavement of a road 14 ft. wide; and at the point where the road, if it were one, would have to cross the Poltross burn, the author observed a bit of Roman masonry, which was discovered by the men when quarrying close by, and which "appears to have been part of the abutment of a bridge." Dr. Bruce, he says, cannot have observed this, as "he remarks that there are no traces of a bridge over the Poltross." This is of course possible, especially as the supposed abutment seems only to have been discovered in the process of some new disturbance of the ground; but only a personal inspection can enable one to adjudicate as to the value of the discovery. The description of the manufacture of the clay cottages in the Drumburgh district, obtained from an old inhabitant, furnishes a curious picture of *al fresco* architecture. The cottages built in this way, of puddled clay with layers of straw at intervals, on a foundation of loose stones, are stated to be warm and comfortable (some are still in existence), and might afford a new hint for remunerative cottage building at low rents; though the picturesque of cottage architecture would hardly be realised, it is to be feared. At many of the farmhouses in the neighbourhood of Alston may be observed relics of the strange customs of an uncivilised age. The cowhouses are below the dwellings, access being had to the latter by stone ladders. In one house at Lonning Head, near Garigill, "the farmer and his cattle enter at the same door, the cattle turning off into the byre, and the farmer turning into the kitchen." This is a true remnant of the old pastoral simplicity; almost a pity, perhaps, that a few such customs should not be kept here and there in odd corners just for their historic interest, and to show how men used to live.

The chief interest of the district, however, is the Roman wall, which one can never see or hear of without a fresh feeling of admiration for the extraordinary people who carried out these great works, as regardless of time and cost as if they were assured that the world was theirs for good, and that a new country, once conquered, was a field for unrestricted future rule to be prepared for and made good by erections and defences, which seemed designed to last for ever, and which at least have long outlasted the use for which they were made. Mr. Jenkinson's book will be worth something to travellers in the Carlisle district, if it only assists them in following and comprehending the remains of the mighty fortification with which the temporary masters of the island designed to ensure their uninterrupted rule, by the simple expedient of "walling up" from seventy to eighty miles of country. Under the modern military system a line of comparatively few forts at intervals would accomplish the object. Before artillery, the thing could only be made complete by building continuously from sea to sea; and that being the case it was done, as a matter of course, and as a simple piece of necessary military strategy, by a people who never did anything by halves. The remark which Scott puts into the mouth of one of his characters, that "our modern labours seem as if constructed out of their fragments," is scarcely an exaggeration.

Papers on Subjects connected with the Duties of the Corps of Royal Engineers. Contributed by Officers of the Royal Engineers. New series, vol. xxii. Woolwich: Jackson & Sons.

In this annual volume we are always sure to meet with papers of practical value and interest, sometimes as much bearing on architects' as on engineers' work. As such we may class the description of the operation of straightening the brick chimney-shaft of the Arsenal Gas-works at Woolwich, attained by a very delicate process of removing piecemeal a course or two of bricks and replacing them by slightly thinner bricks set in sand with only a slight mixture of lime, subsequently raked away till the chimney settled to its bearings on the new bricks, which again were removed and still thinner bricks and thin tiles introduced, the sand filling being removed in the same way, till by repeated operations the chimney had been brought to the perpendicular. A much more elaborate paper, following the above-mentioned, viz., "Notes on Portland Cement Concrete," by Major Macquay, may equally be referred to with advantage by every one concerned in the practical operations of building. The paper is illustrated by careful diagrams. We cannot take the officers of the Royal Engineers as authorities upon architectural design, however; and Major Macquay's statement that concrete dressings have a very good effect with brick must be taken *cum grano*,—they may be made to have a good result, perhaps, but it must be by a special treatment, and not by imitating stone. The paper by Captain Millar on the "Simplification of the Scale of Shade" in map-drawing, and the discussion thereupon, are very interesting in themselves, and not without suggestiveness to all who are concerned in the representation of things, naturally or conventionally, on paper; though of course the considerations here are in direct reference to maps of the face of a country for military purposes. Captain Seddon's paper, on "Our Knowledge of Building Materials, and how to improve it," originally read to the Institute of Architects, is reprinted here. The volume keeps up the reputation of the Corps of Royal Engineers.

Monumental Designs. By Wm. A. Waddington. Published by the Author. Burnley, 1875.

This is a collection of twenty-five plates of lithographed designs for sepulchral monuments, commencing with the simpler form of mere headstones, and increasing in elaboration and scale up to an architectural monument with sculptural decoration. There is no preface or statement of any kind to indicate the footing on which the designs are published, and whether the author is a designer pure and simple,—an architect, in fact,—or whether he is an executor and vendor of monuments. The drawings are very neat, and there is a uniformity of style throughout which indicates that the designer has a definite creed and keeps to it; at the same time the type is not one that we can very cordially admire. It represents that kind of adaptation from French Gothic which has become habitual

here of late, and in which the characteristics of Early French Gothic are exaggerated into a heavy, lumpy, and inelegant style, which has its merit, perhaps, in its capability of being treated so as to procure solidity and massiveness of effect in small things, such as the headstones before referred to, but which becomes less interesting and more cumbersome-looking the larger the scale on which it is applied. Nothing could well be more inartistic than the detail of the angle pinnacles in No. 100, or the pinnacles and spirelet in No. 89. No. 92 is better; but the merit of the collection is in the smaller designs, some of which are good, and all solid-looking,—"too, too solid," in fact; there is cleverness, but want of refinement, in them. There is a good deal of work represented in the collection, which is very well got up.

L'Art: Revue Hebdomadaire illustrée. Nos. 30 and 31. Paris: Heymann.

No. 30 contains a very fine etching by Rajon, from M. Bonnat's portrait of "Mdme. Pasca," in this year's *Salon*. The portrait, which represents the lady full-length in an ample white satin dress, with darker fur trimmings, offers a good subject for effective treatment in etching, from the amount of light in it, which enables the etcher to adopt a free and unlaboured treatment of the principal surfaces. An article on Boulenger gives good and large-size woodcut illustrations of some of his rustic figures. Though in literary and critical power the periodical cannot pretend to rival the *Gazette des Beaux Arts*, its illustrations are of a somewhat kindred excellence, and the advantage of a large page is unquestionable in a publication of this kind. The same number contains an article on the artists connected with *Punch*, with reproductions of some of their works. No. 31 opens with an article on architecture in the *Salon* of the year, by M. de Baudot, presenting nothing special for remark, and not illustrated. A general article on the *Salon* is illustrated by some clever *croquis*, as the French call that rough style of illustration by which they give in a facile manner the spirit of a picture, without going to the time and expense of elaborate engraving. An illustration in this style of Detaille's "Le Régiment qui passe" shows much spirit and character. M. Soldi continues an article on Egyptian sculpture, commenced in a previous number. The larger illustrations in this number are rather deficient in interest, but the publication in general keeps up to its standard.

Miscellanea.

Fall of Churchyard Wall and Railings at Loughborough.—An accident of a serious character occurred on Sunday, the 1st inst., in front of All Saints' Church, Loughborough, by which several persons were injured. Two troops of the 7th Hussars, headed by the band of the regiment, were marched up Church-gate towards All Saints' Church. The street being very narrow, a crush ensued. Opposite the church a crowd congregated, and many persons mounted the churchyard wall,—a height of about 4 ft.,—and held themselves up by taking hold of the upper part of the iron railings, some 4 ft. long. The band on entering the churchyard was stationed near the entrance-gates and played while the soldiers entered the church. This was barely accomplished before a crash was heard, followed by shrieking of women and children. The weight of the people on the walls and their pulling at the top of the rails had had the effect of overhauling the railings, and with them the coping stones for a length of about 45 ft. Persons standing on the causeway were the greatest sufferers, the railings and their occupants being pitched upon them without the slightest warning.

Wells (Somerset).—The little chapel at the northern end of the Vicar's Close is about to be thoroughly restored at a cost of between 600*l.* and 700*l.* This chapel is one of the architectural gems of the city, partly built by Bishop Ralph, of Shrewsbury, in the fourteenth century, and part by Bishop Beckynton, in the fifteenth century. The chapel having fallen into a state of great dilapidation, a proposition was made by a gentleman connected with the Theological College for its restoration. The Vicars Choral, as owners of the chapel, accordingly granted a long lease at a nominal rent, and the work will be begun immediately, under the superintendence of Mr. B. Ferrey, architect.

Surrey Archæological Society.—The members of this society met at Croydon on the 5th inst. for their annual excursion, and proceeded in carriages to Sanderstead Church. A paper on the Manor of Sanderstead was read by Mr. G. Leveson-Gower, the High Sheriff of the county, and the route was then continued to Warlingham Church, which was described by Mr. Ralph Nevill, F.S.A. After refreshments at the Leathern Bottle, the party proceeded to Farley Church, of which Mr. Heales gave a description. Passing through a portion of Surrey and crossing into Kent, West Wickham Church and Manor House were visited, and here they were met by the Archbishop of Canterbury. At Wickham Court, a noble castellated building, Colonel Lennard entertained the excursionists, and gave a history of the mansion. Addington Church and Palace, on the invitation of the Archbishop, were next visited, where papers were read. Returning to Croydon, a collation at the Public Hall, Mr. Seymour Teulon presiding, concluded the proceedings.

Discovery in the Iron Trade.—In one of our iron-making centres experiments of great economic significance are being conducted under the supervision of the senior partner in the firm of Messrs. Rogers, Birchfield, & Co., ironmasters, of Leechburgh, Pennsylvania, who is on a brief visit to this country. Mr. Rogers has applied the natural well-gas of Pennsylvania as a fuel for all the purposes of his ironworks—the heating of furnaces, and the generating of steam; and by the application of blast, injected at the top of the furnace, he has used the principle of the blow-pipe in the making of finished iron, to the conspicuous economy of the working and the improvement of the quality. Mr. Rogers is now occupied in trying to ascertain if the blast can be used in a similar manner in this country, and the experiments made by him have thus far promised equal success in the two countries. If all should be realised which is anticipated, it will be possible to make finished iron of cheap slack instead of costly large coal.

New Franciscan Monastery in Chester. On the 3rd inst., the foundation-stone of a new Franciscan monastery, which is being erected in Grosvenor-street, Chester, was laid by Lord Feilding. The site adjoins the church of St. Francis, which was opened a short time ago by Cardinal Manning. The front elevation is to be of red brick with stone dressings, and three stories high. On the basement there will be small reception-rooms on either side of the main entrance, with dining-room or refectory to the right, and library to the left, and cloister to the rear. The cells, thirteen in number, will be arranged along the corridors in the second and third stories above. The building will cost about 1,500*l.*, of which 400*l.* have been subscribed, and the donors of 25*l.* each will have their names inscribed over the cells. Mr. J. O'Byrne, of Liverpool, the architect of the new church, prepared the plans, and the work will be carried out under the superintendence of Mr. Woolley.

The Borough Surveyor of Kingston.—"No man appears to us," says the *Surrey Advertiser*, "to deserve less the embittered and persistent attacks which have been made on him than Mr. Dunscombe, the borough surveyor of Kingston. With the highest qualifications for his office, and discharging them with the utmost zeal and efficiency, he is an officer whom the borough, or indeed any other in the kingdom, might fairly consider itself fortunate to be able to retain the services of. On Thursday evening, the 5th inst., a further unseemly scene was created by one or two members of the council renewing their absurd protests against this gentleman, but we believe that public opinion will emphatically support the more intelligent members in their determination to put down this feline species of attack on a meritorous officer, whose services are absolutely indispensable to the borough."

Art Union of London.—The exhibition of prizes now open in the Gallery of the Institute of Painters in Water-colours, Pall-mall, is an exceedingly interesting one. In the gallery will also be found Mr. Maclise's original picture in oil of "The Death of Nelson," from which he made the great wall-painting in the Palace of Westminster, companion to that of "Wellington and Blucher," the subject of the Society's last print. The new plate has employed Mr. Sharpe for five years to engrave it, and there is no room to doubt that its success will be at least equal to that of the companion print.

Engineers in Turkey.—Capt. Tyler, Chief Inspector of Railways, Board of Trade, has inspected about 900 miles of railway in that country for the Turkish Government, in company with Mr. Barlow and Mr. Vignoles, in order to report upon the requirements necessary to be executed before they could be definitely received by that Government, and upon the cost of such requirements. That work completed, he undertook, at the special request of the Grand Vizier, in company with Mr. Vignoles, M. Fradet, secretary, and Mr. Payne, to ride through Bosnia and to examine the nature and resources of the country. This journey was performed on horseback, and extended over 19 days, during which about 400 miles were traversed, principally of mountainous country, impassable for wheeled vehicles. To carry tents, cuisine, baggage, servants, &c., upwards of 50 horses were employed daily.

The Yarmouth Aquarium.—The Committee appointed at the recent public meeting to promote the Great Yarmouth Aquarium scheme having ascertained that the amount subscribed outside Yarmouth was only 5,000*l.*, have come to the following resolution:—"That in the opinion of this meeting it is to the interest of the town to promote to the utmost in their power the erection of an aquarium, but that in reference to the question now referred to them it is in their opinion only just and proper that the promoters of the undertaking be requested to show what amount they can raise before the town be applied to for subscriptions." There is a disposition among the Committee, if the shares already taken are increased a certain proportion, to do their best to make up the capital necessary to carry out the aquarium, skating rink, &c., which it is stated would cost 23,000*l.*

Presentation of a Fountain at Birmingham.—The Public Works Committee of the Birmingham Town Council had under their consideration at their meeting on the 3rd inst. an application by Mr. Arthur Ryland, on the part of his sister, Miss Ryland, to be allowed to erect a fountain at the junction of Bradford-street and Moat-row. The application was unanimously granted. It is understood that the fountain will be circular, about 10 ft. 6 in. wide. On each of two sides there will be a large trough for water for cattle and sheep, and the spaces between these troughs will be left open to enable persons to ascend two steps to a circular basin above, into which jets of water will issue. Near to the ground will be troughs for dogs, and the whole structure will be surmounted by an ornamental lamp, and will reach a height of 11 ft. 6 in. The material employed will be granite.

The Advance of Wages in Scotland.—At a meeting of the St. Fergus School Board last week, a letter was read from Mr. William Stuart, builder, stating that, owing to the great advance of wages and material since he had given in his offer for the mason work of the North School, it would be quite impossible to go on with the contract at the present price. He found that 10 per cent. would only be a fair addition, and he would only ask 44*l.* in addition, making the contract price in all 580*l.* Letters had also been received from Mr. Keilman, plasterer, and Mr. Reid, slater, asking certain additions to the terms on which they had offered to do their respective parts of the work of the North School, not exceeding 10 per cent. It was agreed to accept the increased offers.

The Evictions in Spitalfields.—The Great Eastern Railway Company, in evicting from their homes the inhabitants of the dwellings situated in William-street and Fleet-street, Spitalfields, in pursuance of the operations for carrying out the new line, appear to have produced a considerable amount of distress, owing to the fact that in many cases the tenants have been unable to obtain accommodation sufficiently near to their places of employment. Some ninety families, comprising about 800 persons, consisting of costermongers, match-makers, chair-makers, and sempstresses, have been suddenly called upon to remove from their habitations, which they have occupied in some cases for nearly forty years. It has been arranged to hold a public meeting to procure some alleviation of the present distress.

The Town Hall, Brading.—We understand that the inhabitants of Brading are about to take down their ancient Town Hall (which has become somewhat unsafe from age), and rebuild it; and designs for a new erection, after the old style, have been presented to the Corporation by Mr. Varney, of Newport.

Accident at the Dundee New Graving Dock Works.—On the 9th inst., it was discovered that a considerable portion of the floor of the new graving dock had been forced about 7 in. above its centre level, and that water was finding its way into the dock. In order to prevent any serious calamity, it was considered expedient to flood the dock to a slight depth. Mr. Cunningham, the engineer, states that it would not be prudent to make use of the dock until it is strengthened. The whole length of the floor was built in exactly the same way, but the work at the eastern end being recently constructed, was still comparatively green, and yielded to pressure. It was agreed that the opinion of Mr. Leslie, C.E., should be obtained on the matter.

Platform Accident at Scarborough.—Last week a serious accident occurred during the ceremony of laying the corner stones of Sunday schools in the course of erection in connexion with the South Cliff Congregational Church, Scarborough. A temporary wooden platform had been erected for the accommodation of those taking part in the ceremony, and just before proceeding to lay the fifth stone that portion of the platform or scaffolding on the exterior of the building suddenly gave way, and precipitated eight persons to the ground, the planks of which the scaffolding was composed falling upon them. Several of the persons who fell were more or less injured by the fall.

Extension and Improvement of Shoreham Harbour.—The opposition to the extension and improvement of Shoreham Harbour, on a plan proposed by Capt. Wood and submitted to the shareholders and trustees by Mr. W. Hall, has been overcome, and there is now a fair prospect of the Port of Brighton (for such is Shoreham) being placed on such a footing as to be remunerative to its shareholders, and sufficient for the wants of the large populations which it ought to serve. The sum of 100,000*l.* is to be expended upon its extension and improvement under the engineering auspices of Sir J. Hawkshaw. Things having been brought to this point, a Bill will be brought in next Session to effect these objects.

Strome Ferry Pier, Inverness.—The repairing of this massive structure, at which upwards of a dozen men have been occupied for the last seven months, has been completed, under the management of Mr. Alex. Rose, carpenter, and Mr. J. Macdonald, blacksmith, both of Inverness. The old wooden piles, which from a square of 12 in., were reduced since 1870 to a square of 3 in., which tends to show the strength of sea-water here—these old decayed pillars were replaced by seventy-seven new ones of green heart wood from the West Indies, at a cost of 3,000*l.*, this wood being said to be the most durable and hard, next to lignum vitæ.

A Colonial Museum for London.—A deputation from the Council of the Royal Colonial Institute has waited upon Lord Carnarvon, at the Colonial Office, on the subject of establishing a colonial museum in London. The Earl of Carnarvon said he fully appreciated the objects of the deputation, having been in correspondence since he came into office with some of the colonies on the subject. There were difficulties in the way, but he was not without hope of bringing matters to a satisfactory conclusion. He might say that he had already received offers in support of the proposal to the extent of 9,000*l.* or 10,000*l.*, but it was barely more than one-third of the amount required.

Election of District Surveyor.—At the meeting of the Metropolitan Board of Works, on the 6th inst., the Board proceeded to elect a surveyor for the district of St. Saviour, St. George the Martyr, Southwark, and the northern portion of Lambeth. No less than twenty-two candidates were in attendance. The appointment ultimately fell to Mr. Roger Smith. Mr. Selway, as chairman of the Building Act Committee, moved a number of new conditions to be observed, one being that the officer shall keep his district office open daily from ten till six o'clock, and these conditions were agreed to.

Cornwall House of Mercy.—On the 5th inst. the stone of the probationers' ward of this home was laid by the widow of the late Rev. Arthur Tatham, rector of Broadoak and Boconnoc, and Prebendary of Exeter. The ward is built as a memorial of the esteem in which Mr. Tatham was held in the diocese of Exeter, and especially in the county of Cornwall, by his friends.

Little Hulton.—Proposed Sewerage Works.—The Little Hulton Local Board, at their meeting on Monday night, approved of plans submitted by Mr. Williams, C.E., for the sewerage of the district. They also accepted the terms offered by Mr. J. Smith, on behalf of the Bridgewater Trustees, for the lease of a plot of land for 21 years, as a sewage farm. The area of the land is about 18a. 1r. 13p., and the rental which the local board are to pay for it is 5*l.* per statute acre per annum. It was further resolved to apply to the Local Government Board for the loan of 9,000*l.* for the carrying out of the scheme.

Laying the Foundation-stone of the New Masonic Hall, Grimsby.—On the 2nd inst., the foundation-stone was laid of a building to be erected by the Pelham Pillar Masonic Hall Company (Limited), upon an eligible site in Osbourne-street, in close proximity to the Town-hall. The estimated cost of the building, which is to be a Masonic hall, is 3,835*l.* It is said that the progress which Freemasonry has made in the town renders the erection of such an edifice needful.

Opening of the Public Baths, Westbromwich.—The public baths in this town have been opened by Mr. T. Lloyd, a member of the Baths Committee of the Board of Commissioners. The building is adjacent to the new town-hall and forms a detached block. There are two swimming-baths, a first class and a second class. The baths are about 50 ft. by 30 ft., and to each there are about fifty dressing compartments. There are also twelve private baths—eight for males and four for females.

Greenham New Parish Church.—The small Parish Church of Greenham, which had for a lengthened period been a familiar object in the hill-side scenery to the south-east of Newbury, has been razed, the materials being required in the erection of the new structure, the foundation stone of which was laid by the Vicar (Rev. O. E. Slocock). The church will be built in the Early English style of architecture, from the plans of Mr. Woodyear. The contractor is Mr. Samuel Elliott, builder, of Newbury.

Art and Industrial Exhibition at Preston.—An exhibition of works of art and industry was opened on the 9th inst. at Preston by the Mayor, who was supported by the Mayors of neighbouring towns. Lord Winmarleigh, in an address, compared art as it was with what it is, and quoted a number of figures to show the increased value of art productions. Art and science contributed to the intellectual enjoyment and enlightenment of the masses.

Admission to Grosvenor House.—The Duke of Westminster has had a great number of cards prepared, and has sent them to the heads of large establishments, with the view of enabling the *employés* who are engaged, or who take an interest in art industry, to see the pictures and decorations of Grosvenor House. The card admits the holder and four friends on any day in August and September between the hours of two and six p.m.

An Ancient Burial Place.—A correspondent of the *Moscow Gazette* writes from Rjacsan that the workmen excavating ground for the new railway outside that town have uncovered an old burial-place of ancient warriors. Some forty skeletons have been found with implements of war and relics of armour dating from a remote period, namely, swords, arrows, spears, and ornaments worn on the head, made of iron and covered with silver filigree work.

Whitby Sewerage.—At a meeting of the Local Board last week, it was decided to engage Mr. Manser, C.E., London, to undertake the extensive scheme of town sewerage, in which the Board is about to embark. A communication was read from the Local Government Board, sanctioning the raising of a loan of 3,000*l.*, on security of the local rates, for the reconstruction of Spital Bridge, principal and interest to be paid off in thirty years.

The Carmichael Statue, Dundee.—The Committee of the subscribers to this statue having reported to a Committee of the Town Council that they would prefer a site for the erection of the Carmichael statue on the north-east plot of the Albert Institute grounds, the Committee of the Council agreed to grant the request, and have instructed the Town's architect to prepare a block plan of the Institute ground, with the view of regularity in the erection of statues generally.

Architect to the Feckenham School Board.—A meeting of the Feckenham School Board was held at Astwood Bank, on the 4th inst., to appoint an architect for proposed school at Astwood Bank, to accommodate 242 children and teachers' residences; also school at Crabb's Cross, for 350 children and teacher's residences. Several applications were received by the Board, who selected Mr. Ernest A. Day, of Worcester, as their architect.

Plans for the Whitstable School Board Schools.—Several meetings of the School Board were held last week, to examine plans for the erection of Board Schools. About twenty designs have been sent in, principally by London architects. From the number of plans the Board found it a difficult matter to choose the best; but, after due consideration, the design of Mr. Slingsby Stallwood, of Folkestone, was accepted.

The Alleged Bad Foundations of Liverpool Houses.—The Liverpool Health Committee have issued a report on their investigations into insanitary foundations in Liverpool, defending the Corporation from the allegations made by Mr. Alderman Bennett, of Liverpool, to the Local Government Board, to the effect that the foundations of houses in new streets were composed of street refuse and other organic matter dangerous to health.

The Whinbergh School Board.—The Education Department having duly approved of the plans and specification for the erection of a school, and teacher's house attached, as agreed upon by the Board, the formal contract has been signed, by which it is stipulated that the buildings are to be finished by the 1st of February next. The work is now fairly commenced, and the contractor is Mr. William Larner, of East Dereham.

The New Reservoir, Cowes, Isle of Wight. Mr. Richard Barrow, chairman of the Local Board, turned the first sod of the work in connexion with the building of this reservoir on Monday at three in the afternoon, immediately after which the contractors, Messrs. Grice & Woodhouse, set on a large gang of men to commence excavating without further delay, under the supervision of Mr. Manwaring, the engineer.

The late Fire at the Liverpool Landing-Stage.—One of the causes to be tried at the approaching Liverpool Assizes is a claim made by the Mersey Dock Board against the Liverpool Gas Company, the allegation being that the fire which caused the destruction of the stage arose through the carlessness of a plumber who was adjusting gas-pipes.

The Regent's Canal Bridge.—In reply to Sir T. Chambers, in the House of Commons on the 3rd inst., Lord H. Lennox said that steps were being taken to restore the bridge over the Regent's Canal destroyed by the explosion in October last, and since a legal decision had been come to as to who was to bear the cost the works would be proceeded with as fast as possible.

The late Floods.—The inquiry into the cause of the deaths by the floods at Cwn Carn, near Newport, has resulted in a verdict alleging that the Monmouthshire Railway and Canal Company did not keep their reservoir in a safe condition. It is alleged that numerous actions will be brought against the company to recover damages.

Tenders for City Sewers.—The tender of Messrs. Howell & Robson for the diversion of City sewers and the construction of new sewers between the London, Chatham, and Dover Railway and Southwark Bridge, for the sum of 26,500*l.*, was accepted by the Metropolitan Board of Works, on the 6th inst.

New Church at Eltham.—The Bishop of Rochester consecrated a new church at Eltham, near Blackheath, on the 3rd inst. The church, which is dedicated to St. John the Baptist, is from the design of Mr. A. W. Blomfield. The building, which will serve as the parish church, has been erected at a cost of 10,000*l.*

New Church Schools for Accrington.—On the 6th inst. the corner-stone of St. Peter's Church of England new schools was laid at Accrington, by Mrs. Hargreaves, wife of Colonel Hargreaves, of Broad Oak. The schools, when finished, will accommodate 600 children.

Strike of Six Hundred Locksmiths.—On Monday, the locksmiths of Wolverhampton, excepting those in the plate department, began a strike for an advance in wages of 10 per cent.

Convention of the American Institute of Architects.—We have before us a published report of the proceedings of the eighth convention of this Institute, and had prepared some extracts from it for publication. We are forced, however, to postpone them.

School, Todmorden.—The Hebden Bridge sites committee recommended the purchase of a site for a school at Lower Stubbins, to accommodate 500 children, and Mr. John Sutcliffe, architect, was appointed to draw a plan. The recommendation was approved.

Statue to Lord Mayo.—The late Governor-General of India (Earl Mayo), who was murdered by a native, is to have a statue at Cockermouth, with which is memory is associated. Lord Napier and Ettrick will unveil the statue on the 19th inst.

Alarming State of Wem Parish Church. A few mornings since a portion of the stonework of the top window on the south side of the steeple, fell on the roof of the vestry, and caused great destruction to the slates and rafters. The tower is in a very decayed state.

Margate.—At a meeting of the Council on the 3rd inst., it was resolved, on the recommendation of the surveyor, that sea-water should be used for the purpose of watering the roads.

Farming.—Mr. C. H. Birbeck, proprietor of *Berrow's Worcester Journal*, has offered a prize of 100*l.* for the best-managed farm in the county.

The London Roads.—For 11,500,000*l.*, given on p. 680 as the cost of maintaining the roadways, read 1,500,000*l.*

TENDERS

For detached villa residence, with studio, at Hampsteadhill Gardens, for Mr. J. Ingle Lee. Messrs. Batterbury & Huxley, architects:—

King (accepted)	£1,680 0 0

For reinstatement, after fire and alterations, to No. 10, Chenies-street, Tottenham-court-road, for Messrs. Hewetson & Milner. Messrs. Batterbury & Huxley, architects:—

W. & F. Smith (accepted)	£426 0 0

For the enlargement and additions to Sandy Schools, Beds. Mr. John Usher, architect:—

Haynes	£595 0 0
Knight & Boston	585 0 0
Witkey	549 0 0
Coban	547 0 0
Cunvin	531 5 0
Twelvetrees	492 0 0

For Messrs. Sutton's new premises, King's-road, Reading. Messrs. W. & J. T. Brown and F. W. Albury, architects:—

Woodbridge	£2,980 0 0
Searle	2,951 14 0
Filewood	2,945 0 0
Barnicoat	2,912 0 0
Woodroffe (accepted)	2,799 0 0

For additions and alterations at Weston Lodge, Putney Park, Surrey, for Mr. S. Merriman. Quantities supplied:—

Hobson	£760 0 0
Adamson	750 0 0
Arlees	731 0 0

For additions and alterations to Avenue House, Church End, Finchley, for Mr. H. C. Stephens. No quantities:—

M'Lachlan & Son	£2,573 0 0
Hobson	2,467 0 0
Ploughman	2,420 0 0
Cooper	2,365 0 0

For new roof over carriage factory, Upper Montague-street, for Messrs. Peters & Sons. Mr. A. C. Cumings, architect:—

Benstead & Sons	£1,370 0 0
C. & N. Foster	1,320 0 0
Mark	1,153 0 0
Harris & Sons	1,182 0 0

For proposed new buildings: comprising two shops in Bell-street, and the formation of a mews with twenty-eight stables and thirteen shops, in Chapel and Burne streets, Edgware-road, with gateway, entrance, and workrooms over, and at the rear a warehouse building, with private stabling, workrooms, covered yards, &c., for Mr. D. B. Johnstone. Messrs. Bird & Walters, architects:—

Jackson & Shaw	£30,110 0 0
Hill, Higgs, & Hill	29,990 0 0
Macey	29,841 0 0
Ennor	29,367 0 0
Brass	28,882 0 0
Nightingale	28,750 0 0
Lawrence	28,720 0 0
Williams & Son	28,597 0 0
M'Lachlan & Son	28,430 0 0
Cooke & Green	28,373 0 0
Bangs	27,989 0 0
Newman & Mann	27,756 0 0
Adamson & Sons	27,09? 0 0
Temple & Foster	26,060 0 0
Elkington	25,993 0 0
Mark (accepted)	25,960 0 0

For the erection of new premises, No. 68, Leadenhall-street, for Messrs. W. Morrison & Sons. Mr. J. T. Newman, architect. Quantities supplied by Messrs. R. L. Curtis & Sons:—

Foster	£1,868 0 0
Ashby, Brothers	1,847 0 0
Scrivener & White	1,753 0 0
Niblett & Son	1,750 0 0
Read & Son	1,747 0 0
Mortar	1,694 0 0
Ennor	1,686 0 0
Sharpington & Cole	1,668 0 0

For the erection of a villa residence, at Sutton, Surrey, for Mr. Arthur J. Allard. Mr. J. T. Newman, architect. Quantities supplied by Messrs. R. L. Curtis & Sons:—

Mitchell	£3,500 0 0
Peskett & Taylor	3,465 0 0
Sharpington & Cole	3,161 0 0
Hosking, Brothers	3,067 0 0
Legge	3,050 0 0
Jarrett	2,890 0 0

For the erection of a block of school buildings, Kirkdale-road, Leyton, for the Leyton School Board. Mr. J. T. Newman, architects. Quantities supplied by Messrs. R. L. Curtis & Sons:—

Ashby, Brothers	£4,283 0 0
Reid	4,042 0 0
Arber	4,025 0 0
Hosking, Brothers	3,975 0 0
Rivett	3,973 0 0
Sayers	3,718 0 0

For Lambeth Infirmary, out-door labour-yard, and receiving wards. Messrs. Fowler & Hill, architects. Quantities for infirmary by Messrs. Lamb & Church; for out-door labour-yard and receiving wards, by Messrs. Fowler & Hugman:—

Stephenson	£ 8,776 0 0
Crockett	61,945 0 0
Oliver	60,280 0 0
Sherman	59,914 0 0
Howard	58,190 0 0
Crocker	56,565 0 0
Downs & Co.	56,550 0 0
Hart	55,840 0 0
Chapell	55,500 0 0
Nightingale	55,439 0 0
Pearson	55,153 0 0
Hill, Higgs, & Hill	54,400 0 0
Perry & Co.	53,846 0 0
Taylor	53,600 0 0
Tarrant	53,200 0 0

For the erection of new farm-buildings, at Redlands, near Ashwell, Herts, the property of Mr. James White, exclusive of sand and carriage of all materials. Mr. W. Watson, architect:—

Bailey & Son	£2,577 10 0
Sabey & Son	2,540 0 0
Redhouse	2,533 9 0
Dunham	2,377 0 0

For rebuilding the Red Cap, Camden-town. Mr. H. H. Bridgman, architect. Quantities by Mr. W. Barnett:—

Wilson, Brothers	£6,235 0 0
Manley & Rogers	5,864 0 0
Kelly, Brothers	5,730 0 0
Tomms	5,665 0 0
Crockett	5,529 0 0
Elkington	5,510 0 0
Bracher & Son	5,497 0 0
Tarrant	5,460 0 0
Scrivener & White	5,293 0 0
Atkinson & Walker	5,190 0 0

For rebuilding warehouses, Nos. 16 and 17, Windmill-street, Finsbury, for Mr. T. C. Usher. Mr. John Groom, architect. Quantities by Mr. B. A. C. Herring:—

Downes & Co.	£1,308 0 0
Maraland & Son	1,295 0 0
Chapman	1,250 0 0
Langmead & Way	1,237 0 0
Kelly, Brothers	1,220 0 0
Scrivener & White	1,174 0 0
Crabb (accepted)	1,109 0 0

For enlarging and building new school to Wesleyan Chapel, Southall, Middlesex. Mr. Baker, architect. Quantities not supplied:—

Brown	£1,040 0 0
Baker	770 0 0
Gibson	747 0 0
Taylor	694 0 0
Bailey	481 10 0

For the erection of school buildings, with teacher's residence, at Beguildy, Knighton. Mr. E. H. Lingen Barker, architect:—

Jones	£901 0 0
Birrell	898 18 5
Bufton	799 0 0

For alterations and additions to house, in High-street, Barnes, for Mr. W. H. Ratcliff. Messrs. Tress & Innes, architects:—

Tozer (accepted)	£940 0 0

For pulling down and rebuilding stables, &c., at Fairseat, Highgate, for Sir Sydney H. Waterlow. Messrs. Davis & Emanuel, architects. Quantities by Messrs. Linsdell & Giffard:—

Woodward	£1,790 0 0
Newman & Mann	1,735 0 0
Williams & Son	1,689 0 0
Southcott & Co.	1,598 0 0
Holmes	1,484 0 0

For the erection of school buildings, with teacher's residence, at Crugybyther, Radnorshire. Mr. E. H. Lingen Barker, architect:—

Jones	£1,024 0 0
Speake	983 15 7
Birrell	933 13 0
Bufton	809 0 0

For alterations and repairs to the Goat in Boots, Fulham-road, London. Mr. H. J. Newton, architect. Quantities by Mr. Budd:—

Boden	£565 0 0
Godden	550 0 0
Taylor	530 0 0
Shurmur	528 0 0
Hockley (accepted)	518 0 0

TO CORRESPONDENTS.

Erratum.—In "Report of Privy Council on Education," line 20, for "these *ten* years," read "these *two* years."

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